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Lindsay Light II
Phase 2
Final Closure Report

STS Project No. 24418-RR

January 11, 2000



LINDSAY LIGHT II SITE

PHASE 2

FINAL REPORT

Revision Number : 0

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Date:

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New

AFFIDAVIT

Under penalty of law, I certify that, to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of this report, the information submitted is true, accurate, and complete.

Richard G. Berggreen
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1/11/00
Date

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PHASE 2
FINAL CLOSURE REPORT

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1.0 INTRODUCTION

1.1 Identification of Facility

The Lindsay Light II Site, 316 East Illinois Street in Chicago, Illinois, consists of the block bounded on the east by McClurg Court, on the south by Illinois Street, on the west by Columbus Drive, and on the north by Grand Avenue (Figure 1.1).

1.2 Hazardous Substances

Thorium-impacted soil was present at the site at levels above background concentrations. The Unilateral Administrative Order issued by the USEPA June 6, 1996, specified cleanup to total radium (Ra226 and Ra228) concentrations of background plus 5 pCi/gm, which is 7.1 pCi/gm or lower. At the time the work described herein began, known contamination on-site was limited to an area near the south central portion of the site referred to as Lake Lindsay. That area remained after previous removal efforts extended to and below the groundwater table, and further remediation was constrained by standing water. Other smaller areas of contamination were suspected in the shallow (0 - 12 feet) fill soils, but were not previously identified, or had been removed. Figure 1.2 shows the Lake Lindsay area, the areas previously remediated, and those areas identified and remediated as part of this work effort.

1.3 Chronological Narrative

The operations which resulted in the release of contamination, the explorations to document the apparent extent of impacted soils, and the previous efforts at remediation (1996-1997) are described in a separate report (Phase I Final Report, Kerr-McGee Chemical LLC). This report covers the remediation which was associated with the construction of the River East Center Mixed Use Development which began June 2, 1999.

Section 2.0 describes the remedial actions taken. These actions were in accordance with the Work Plan (Attachment A) submitted to and approved by USEPA prior to commencement of this work.

The activities were coordinated with the construction operations and in general proceeded as follows:

- Asphalt pavement was stripped (proceeded in phases). Asphalt stripping began June 2, 1999.
- Soil below asphalt was field surveyed¹ for elevated gamma radiation as the soil was exposed.
- General site grade was lowered in maximum 2 foot lifts to approximately minus 5 feet, and field survey was conducted at each lift. Site grading began June 1, 1999.
- Concurrent with site grading, the perimeter of the site was excavated to minus 8 feet, for slurry wall guide wall, and field surveyed as it was excavated.
- Caisson locations were test pitted to remove obstructions, and the test pits were field surveyed through the fill soils to ± 12 feet. Caisson test pits were initiated June 6, 1999, and completed July 29, 1999.
- Caisson spoil from within the Lake Lindsay area was field surveyed. Caissons in Lake Lindsay were drilled June 29, 1999 through July 29, 1999.
- Slurry wall panels within the Lake Lindsay area had excavation spoil field surveyed. Lake Lindsay slurry wall panels were excavated between August 18, 1999 and September 18, 1999.

¹ Field surveying was performed in accordance with the Work Plan for the site, approved by USEPA, dated July 8, 1999. When thorium-impacted soils (soils with gamma count rates indicating total radium activity exceeding 7.1 pCi/gm) were identified, they were removed to the apparent limits of contamination, samples were collected for off-site verification, and the excavations screened by USEPA representatives and, as appropriate, released by USEPA in accordance with the Work Plan.

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- The Lake Lindsay area was excavated to the limits of the thorium-impacted soils and those limits were field surveyed. Excavation of Lake Lindsay began September 21, 1999 and was completed October 21, 1999.

Release verification forms for the identified contamination areas were signed by USEPA representatives as each area was documented as meeting clean-up objectives. These forms are included in Attachment B. The site was reported to meet clean-up criteria by USEPA on November 11, 1999.

2.0 REMEDIAL ACTIONS

Considerable construction activity proceeded concurrent with the remediation activities. This report includes descriptions of the construction activities where they were integral to the remediation operations.

The remedial actions presented below are more thoroughly described in the Work Plan.

2.1 Soil Removal

2.1.1 Asphalt Removal/Soil Screening

The asphalt pavement was stripped from the site in phases beginning at the east end. The soil immediately beneath the asphalt was surveyed for elevated gamma radiation. Field survey data for the asphalt removal soil screening are presented in Section 4.1.1.1. If the soil was found to be contaminated, the overlying asphalt was disposed as contaminated. One load, estimated at 10 tons of contaminated asphalt was disposed.

The soil immediately beneath the asphalt was screened in accordance with the Work Plan. Areas exhibiting elevated gamma radiation were staked and designated exclusion zones, and the soil removed to clean limits.

2.1.2 Site Grading to Minus 5 Feet

The site was excavated to an initial depth of approximately 5 feet below original grade in several lifts. The lifts were less than 2 feet in thickness, and the ground surface was field screened for gamma radiation between lifts. This limitation on excavation lift thickness and field screening did not apply in those areas previously excavated and remediated.

Sections 4.1.1.2 through 4.1.1.4 include the field survey data for the various excavation lifts sitewide.

Areas identified as exhibiting elevated gamma radiation were excavated to clean limits. Of the 21 contaminated areas identified outside Lake Lindsay, 15 were identified as part of the site-wide excavation. Figure 1.2 shows the location of the contaminated soils remediated as part of this work effort.

2.1.3 Caisson Test Pit Excavation

When the general site grading had lowered the site to approximately minus 5 feet, the 132 caisson locations were explored for obstructions through excavation of test pits. These test pits extended through the fill soils to the natural sand. The excavations were screened for indications of contamination. This screening did not take place within the Lake Lindsay area where contamination was known to exist below the backfill. Analytical data from the test pit screening is provided in Section 4.1.2. Two areas of contamination were identified and remediated in the course of the test pit exploration (Areas 9 and 13, Figure 1.2).

2.1.4 Guidewall Excavation

A perimeter structural slurry wall provides support for the deep excavation. In order that the slurry wall be properly aligned, a guidewall was installed and an excavation for that guidewall circled the site perimeter, extending to approximately 8 feet deep. This guidewall excavation was field surveyed as it was dug, in approximately 2 foot lifts. Contamination discovered in the course of this guidewall excavation and surveying (Areas 5, 10, 12, and 21, Figure 1.2) was typically removed on-site to clean limits. At one location near the northeast corner of the site along Grand Avenue, the removal of the contamination along the north wall of the excavation, off-site beneath Grand Avenue (Area 10, Figure 1.2), was constrained by the presence of a water main. A Highway Authority Agreement was

developed to address this and other off-site residual contamination. That Highway Authority Agreement was finalized September 27, 1999, and is included as Attachment C

Section 4.1.3 provides the field screening results for the guidewall excavation.

2.1.5 Lake Lindsay Area

The Lake Lindsay area (see Figure 1.2) is that area which was known to be contaminated following the Phase 1 remediation conducted by Kerr-McGee. The contamination remained due to the presence of groundwater which constrained excavation below approximately 13 feet. With the installation of the slurry wall to cut off infiltration, the soil could be effectively dewatered and removed as part of the construction excavation. Three activities involved removal of contaminated soil from the Lake Lindsay area.

Caisson Excavations - As the caissons were excavated through potentially contaminated soil intervals in Lake Lindsay, the excavated soil was screened in accordance with the Work Plan. A total of 22 caissons were installed within Lake Lindsay. Section 4.1.4 presents the field screening data from the caisson excavations in Lake Lindsay.

Slurry Wall Panel Excavation - Where the slurry wall extended through the Lake Lindsay area, soil excavated was potentially contaminated. The material was screened for contamination and handled as appropriate. Section 3.4 describes the field modification proposed and approved for the clam bucket screening. Section 4.1.5 presents the field data from the slurry wall excavated materials.

Lake Lindsay Mass Excavation - The Lake Lindsay area represented the largest and deepest volume of soil to be removed in this phase of removal. The excavation initially required removal of clean backfill gravel. The contaminated soils were excavated in subdivided areas within the larger Lake Lindsay area, and each of those smaller areas were surveyed

clean and verification samples collected and analyzed in accordance with the Work Plan. Figure 2.1 shows the subdivided areas used to document the removal from the Lake Lindsay area. Note that the field surveying continued until apparently clean material was encountered, USEPA personnel conducted their verification survey, and if both surveys agreed, a verification sample was collected and analyzed. The prompt (less than 45 minute) turnaround on sample results precluded the need for field data sheets. Section 4.2.1 includes the field laboratory data from the Lake Lindsay area.

2.2 Verification Sampling

When field screening indicated clean-up had proceeded to achieve the specified criteria of less than or equal to 7.1 pCi/gm, verification samples were collected and split with USEPA. Results of the verification samples analyzed by MCL/River East are presented in Section 4.2.

2.3 Resources Committed for Remediation

The following presents the resources committed for completion of the thorium-impacted soil remediation. Note these costs and resource estimates are as can best be distinguished from the construction activities which operated concurrently. Resources for management of petroleum contamination encountered at the site are presented separately.

Thorium Remediation Costs - MCL/River East	\$1,000,000
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Transportation and Disposal Costs - Thorium-impacted soil provided by Kerr-McGee Chemical LLC in Phase I Report	\$ (Provided by Others)
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Personnel

Construction Project Management	Morse-Diesel, Inc.
Environmental Management	STS Consultants, Ltd.
Health Physics Subcontractor	Radiation Safety Services, Inc.
Excavation Subcontractor	Budron, Inc.
Caisson, Slurry Wall Subcontractor	Case Foundation, Co.
Transportation and Disposal Provided Through	Kerr-McGee Chemical LLC
Total Personnel Completing Site Specific 8 Hour Training	94

Petroleum Remediation Costs	\$500,000
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2.4 Quantities of Materials Removed and Disposal Sites

2.4.1 Quantities of Thorium-Impacted Soil and Disposal Site

1999

Containers Shipped	221
Tons Shipped	4808.5

Material disposed at EnviroCare, Clive, Utah

2.4.2 Quantities of Petroleum Impacted Soil and Disposal Sites

1999 Cubic Yards Shipped ²	16,764
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² Petroleum impacted soil continues to be generated as excavation at the site proceeds (Total through December 1999).

Material disposed at:

Settlers Hill, Batavia, Illinois
CID, Calumet City, Illinois
Community Landfill, Morris, Illinois

2.5 Underground Storage Tanks

Two underground storage tanks (USTs), estimated at 10,000 gallon capacity, were encountered in the course of site excavation. The tanks were removed and the site was signed off by the City of Chicago Department of Environment. Locations of the tanks are shown on Figure 1.2

2.6 Air Monitoring

Air monitoring was conducted on a full time basis at the property boundaries. This monitoring continued until the site was verified as meeting the clean-up objectives by USEPA. Results of the site air monitoring are presented in Section 4.2.4. These include daily pancake screening data of the filters and the weekly analyses of the collected filters.

Personal air monitoring was provided for individuals working in the exclusion zones. These data are presented in Section 4.2.5.

None of the analyses indicated air concentrations which exceeded health risk criteria.

*Let's be consistent
CDOE & CFire per
Bono's Report*

3.0 DIFFICULTIES ENCOUNTERED AND RESOLUTIONS

3.1 Water Table

The Lake Lindsay area of thorium-impacted soil remained after the previous remedial effort because the shallow water table constrained deeper excavation. Installation of the slurry wall eliminated significant infiltration into the excavation. However, the existing water remaining in the soil within the slurry wall required removal for two reasons. Excavation could not proceed below water, and the soil to be disposed at Envirocare could not contain free water.

Wells were installed to lower the water table. Desilting boxes were installed to facilitate settling of suspended sediment before discharge of the water to the city sewers. Sediment samples were analyzed to assess potential contamination. Results of those analyses are presented in Section 4.2.2.

Wet soils were encountered and on two occasions containers with free water were documented when received at Envirocare. Efforts to facilitate dewatering of the wet soils included:

- Excavated soil was staged on the sloping walls of the test pits at caisson locations. These test pits were excavated before the dewatering efforts had significantly lowered groundwater levels. Temporary staging allowed the water to drain before soils were loaded into shipping containers.
- Excavated soil was staged in stockpiles for excavation of portions of Lake Lindsay. This facilitated draining the water before loading into shipping containers.

- Sorbant material was blended with the soils as they were loaded to minimize potential accumulation of free water.
- Soils were tested with a paint filter prior to loading to document the absence of free water.

3.2 Installation of Caisson Casings and Tops

A temporary casing was installed at the top of each caisson to retain the fill and sand soils. The exceptions were the perimeter caissons which had permanent casings as part of the slurry wall system.

Contamination screening at each caisson location provided for identification and removal of thorium-impacted soils during test pit exploration for obstructions. In the Lake Lindsay area, there was an additional potential to encounter contamination in the natural sand below the fill soils.

When the temporary casings were installed, they were typically vibrated into place. The installation would occasionally encounter an obstruction or dense soil zone resisting vibratory casing installation methods. An alternative method involved creating a mud slurry, drilling below the casing to allow the obstruction or soil to be loosened and advancing the casing. This was not acceptable in the Lake Lindsay area due to the potential to homogenize and dilute contamination in the mud slurry.

In the Lake Lindsay area, a short auger flight was used to drill out the soil without benefit of a mud slurry. The auger and cuttings were screened for contamination and the soil managed as appropriate depending on the screening results. The short flight allowed the auger rig to operate inside and over the top of the casing prior to its installation. The

casings were then advanced by vibratory methods to their design depth and subsequently removed following installation of the caisson steel and concrete.

3.3 Off-Site Contamination Beneath Grand Avenue

The northeast corner of the site (Area 10 on Figure 1.2) exhibited contamination above the clean up level of 7.1 pCi/gm. Efforts to remove all apparently contaminated soil were constrained by the presence of a water main within the contaminated soil. The water main ran east-west, parallel to the site margin and was off-site beneath Grand Avenue.

Thorium-impacted soil was allowed to remain in place over a minimum documented length of approximately 29 feet. The location was included in the areas covered by the Highway Authority Agreement, along with areas beneath Illinois Street and areas under the sidewalk along Columbus Drive. The Highway Authority Agreement was finalized on September 27, 1999. A copy is included in Appendix C.

3.4 Slurry Wall Clambucket Screening

Several panels of the slurry wall cross the southern part of the Lake Lindsay area. As a result, those panels have the potential to encounter thorium-impacted soil during excavation. The Work Plan anticipated this potential and included a provision to screen the material as it was excavated while still being held in the excavator bucket.

The equipment which was used for the slurry wall excavation included two rigs using two different buckets. The one used in the Lake Lindsay area did not allow for readily screening the soil from the top, and the sides of the bucket were judged sufficiently thick to constrain effective screening.

A modification was proposed and approved by USEPA (copy attached as Attachment D). That modification provided for the excavation spoil to be deposited in a staging area and screened using a walk-over method on a bucket-by-bucket basis while excavation progressed to a minimum depth of 23 feet or to the top of the natural clay. The staging area and any areas impacted by water draining from that area would require screening following removal of any contaminated trench spoil.

4.0 ANALYTICAL RESULTS

4.1 Field Screening

Field screening data consist of those results collected with hand-held instruments for real time measurements of exposed and near surface soils. These measurements include the site-wide surveys as the entire site was excavated (Section 4.1.1), the caisson test pit excavations (Section 4.1.2), the guidewall excavation (Section 4.1.3), and the Lake Lindsay area work (Sections 4.1.4 and 4.1.5).

4.1.1 Site-Wide Surveys

Site-wide survey results presented below are subdivided into four sections. The data are presented on separate tables for each of the four sections. Those tables, sub-asphalt, first cut, second cut, and third cut, present the results of the field surveys which were performed using the same method. The property was placed on a 5 meter grid system. At the intersections of the gridlines, 30 second counts were measured. The space between lines was walked at 1 meter spacings.

Two instruments were used for this field screening. The Eberline Model ESP-1 is denoted on the tables with a "1". The second type of instrument used was a Ludlum Model 193, denoted with a "2".

The ESP-1 took 30 second readings. Those readings were multiplied by 2 to give readings in CPM.

4.1.1.1 Sub-Asphalt

The soil immediately beneath the asphalt was screened in a 5 meter grid. Screening used two instruments, an Eberline Model ESP-1 (denoted with a "1" on the following table) and a Ludlum 193 (denoted with a "2" on the table). The Eberline raw data was for 30 second readings, which were multiplied by 2 to obtain the CPM values on the table.

The CPM threshold indicative of potential contamination was 5,179 for the Ludlum 193 and 10,619 for the Eberline ESP-1. These values represent approximately 80 percent of the response expected from exposed soil with activities at or above the 7.1 pCi/g clean-up objective.

Note that when the soil was identified as contaminated, the asphalt which had covered that soil was considered contaminated and was loaded and disposed of as thorium-contaminated soil.

The following table presents the maximum reading recorded for the grid cell. The east-west and north-south grid designations refer to the column lines and rows referenced on Figure 1.2.

Table 4.1.1.1

Sub-Asphalt Results

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
Sub-Asphalt	2	A	11.5	06/19/1999	3800	3800
Sub-Asphalt	1	A	14	06/09/1999	1710	3420
Sub-Asphalt	1	A	14.5	06/09/1999	1860	3720
Sub-Asphalt	1	A	15	06/09/1999	1630	3260
Sub-Asphalt	1	A	15.5	06/09/1999	1490	2980
Sub-Asphalt	1	A	16	06/09/1999	1820	3640
Sub-Asphalt	1	A	16.5	06/09/1999	1940	3880
Sub-Asphalt	1	A	17	06/09/1999	2700	5400
Sub-Asphalt	1	A	17.5	06/09/1999	1890	3780
Sub-Asphalt	1	A	18	06/09/1999	2480	4960
Sub-Asphalt	1	A	18.5	06/09/1999	2160	4320
Sub-Asphalt	1	A	19	06/09/1999	2220	4440
Sub-Asphalt	1	A	19.5	06/09/1999	1970	3940
Sub-Asphalt	1	A	20	06/09/1999	2340	4680
Sub-Asphalt	1	A	20.5	06/09/1999	2390	4780
Sub-Asphalt	1	A	21.2	06/09/1999	2120	4240
Sub-Asphalt	1	A	22	06/09/1999	2250	4500
Sub-Asphalt	1	A.2	14	06/05/1999	1000	2000
Sub-Asphalt	1	A.2	14.5	06/05/1999	1690	3380
Sub-Asphalt	1	A.2	15	06/05/1999	1600	3200
Sub-Asphalt	1	A.2	15.5	06/05/1999	1430	2860
Sub-Asphalt	1	A.2	16	06/01/1999	2190	4380
Sub-Asphalt	1	A.2	16.5	06/01/1999	2270	4540
Sub-Asphalt	1	A.2	17	06/01/1999	2260	4520
Sub-Asphalt	1	A.2	17.5	06/01/1999	2200	4400
Sub-Asphalt	2	A.2	18	06/01/1999	6000	6000
Sub-Asphalt	2	A.2	18.5	06/01/1999	8000	8000
Sub-Asphalt	2	A.2	19	06/01/1999	5000	5000
Sub-Asphalt	2	A.2	19.5	06/01/1999	6000	6000
Sub-Asphalt	2	A.2	20	06/01/1999	7000	7000
Sub-Asphalt	2	A.2	20.5	06/01/1999	4000	4000
Sub-Asphalt	2	A.2	21.2	06/01/1999	6000	6000
Sub-Asphalt	2	A.2	22	06/01/1999	5000	5000
Sub-Asphalt	1	A.5	14	06/05/1999	1080	2160
Sub-Asphalt	1	A.5	14.5	06/05/1999	1460	2920
Sub-Asphalt	1	A.5	15	06/05/1999	1470	2940
Sub-Asphalt	1	A.5	15.5	06/05/1999	1370	2740
Sub-Asphalt	1	A.5	16	06/01/1999	2410	4820
Sub-Asphalt	1	A.5	16.5	06/01/1999	1450	2900
Sub-Asphalt	1	A.5	17	06/01/1999	1360	2720
Sub-Asphalt	1	A.5	17.5	06/01/1999	1370	2740
Sub-Asphalt	2	A.5	18	06/01/1999	6000	6000
Sub-Asphalt	2	A.5	18.5	06/01/1999	7000	7000
Sub-Asphalt	2	A.5	19	06/01/1999	5000	5000
Sub-Asphalt	2	A.5	19.5	06/01/1999	5000	5000
Sub-Asphalt	2	A.5	20	06/01/1999	6000	6000
Sub-Asphalt	2	A.5	20.5	06/01/1999	7000	7000
Sub-Asphalt	2	A.5	21.2	06/01/1999	5000	5000
Sub-Asphalt	2	A.5	22	06/01/1999	4000	4000

Prepared By:

01/10/2000

Table 4.1.1.1

Sub-Asphalt Results

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
Sub-Asphalt	1	A.7	14	06/05/1999	1530	3060
Sub-Asphalt	1	A.7	14.5	06/05/1999	1180	2360
Sub-Asphalt	1	A.7	15	06/05/1999	1230	2460
Sub-Asphalt	1	A.7	15.5	06/05/1999	1500	3000
Sub-Asphalt	1	A.7	16	06/01/1999	2430	4860
Sub-Asphalt	1	A.7	16.5	06/01/1999	1500	3000
Sub-Asphalt	1	A.7	17	06/01/1999	1480	2960
Sub-Asphalt	1	A.7	17.5	06/01/1999	1530	3060
Sub-Asphalt	2	A.7	18	06/01/1999	5000	5000
Sub-Asphalt	2	A.7	18.5	06/01/1999	4000	4000
Sub-Asphalt	2	A.7	19	06/01/1999	4000	4000
Sub-Asphalt	2	A.7	19.5	06/01/1999	4000	4000
Sub-Asphalt	2	A.7	20	06/01/1999	6000	6000
Sub-Asphalt	2	A.7	20.5	06/01/1999	5000	5000
Sub-Asphalt	2	A.7	21.2	06/01/1999	5000	5000
Sub-Asphalt	2	A.7	22	06/01/1999	3500	3500
Sub-Asphalt	2	B	14.5	06/10/1999	3000	3000
Sub-Asphalt	2	B	15	06/10/1999	3500	3500
Sub-Asphalt	2	B	15.5	06/10/1999	6000	6000
Sub-Asphalt	1	B	16	06/01/1999	3100	6200
Sub-Asphalt	1	B	16.5	06/01/1999	1420	2840
Sub-Asphalt	1	B	17	06/01/1999	1530	3060
Sub-Asphalt	1	B	17.5	06/01/1999	1390	2780
Sub-Asphalt	2	B	18	06/01/1999	6000	6000
Sub-Asphalt	2	B	18.5	06/01/1999	5000	5000
Sub-Asphalt	2	B	19	06/01/1999	5000	5000
Sub-Asphalt	2	B	19.5	06/01/1999	5000	5000
Sub-Asphalt	2	B	20	06/01/1999	5000	5000
Sub-Asphalt	2	B	20.5	06/01/1999	6000	6000
Sub-Asphalt	2	B	21.2	06/01/1999	4000	4000
Sub-Asphalt	2	B	22	06/01/1999	4000	4000
Sub-Asphalt	2	B.2	14.5	06/10/1999	3000	3000
Sub-Asphalt	2	B.2	15.5	06/10/1999	6000	6000
Sub-Asphalt	1	B.2	16	06/02/1999	2760	5520
Sub-Asphalt	1	B.2	16.5	06/01/1999	2680	5360
Sub-Asphalt	1	B.2	17	06/01/1999	2910	5820
Sub-Asphalt	1	B.2	17.5	06/01/1999	3120	6240
Sub-Asphalt	2	B.2	18	06/01/1999	8000	8000
Sub-Asphalt	2	B.2	18.5	06/01/1999	7000	7000
Sub-Asphalt	2	B.2	19	06/01/1999	8000	8000
Sub-Asphalt	2	B.2	19.5	06/01/1999	6000	6000
Sub-Asphalt	2	B.2	20	06/01/1999	5000	5000
Sub-Asphalt	2	B.2	20.5	06/01/1999	8000	8000
Sub-Asphalt	2	B.2	21.2	06/01/1999	5000	5000
Sub-Asphalt	2	B.2	22	06/01/1999	3000	3000
Sub-Asphalt	1	B.4	1.5	06/17/1999	1570	3140
Sub-Asphalt	1	B.4	16	06/02/1999	4690	9380
Sub-Asphalt	1	B.4	16.5	06/01/1999	2090	4180
Sub-Asphalt	1	B.4	17	06/01/1999	Exclusion	Zone

Prepared By:

01/10/2000

4:56 PM

Eric S. Pittman

Table 4.1.1.1

Sub-Asphalt Results

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
Sub-Asphalt	1	B.4	17.5	06/01/1999	2190	4380
Sub-Asphalt	2	B.4	18	06/01/1999	9000	9000
Sub-Asphalt	2	B.4	18.5	06/01/1999	6000	6000
Sub-Asphalt	2	B.4	19	06/01/1999	6000	6000
Sub-Asphalt	2	B.4	19.5	06/01/1999	4000	4000
Sub-Asphalt	2	B.4	20	06/01/1999	5000	5000
Sub-Asphalt	2	B.4	20.5	06/01/1999	6000	6000
Sub-Asphalt	2	B.4	21.2	06/01/1999	3000	3000
Sub-Asphalt	2	B.4	22	06/01/1999	3000	3000
Sub-Asphalt	1	B.8	1	06/17/1999	2850	5700
Sub-Asphalt	1	B.8	1.5	06/17/1999	1620	3240
Sub-Asphalt	1	B.8	2	06/16/1999	1610	3220
Sub-Asphalt	1	B.8	2.5	06/16/1999	1580	3160
Sub-Asphalt	1	B.8	3	06/11/1999	1350	2700
Sub-Asphalt	1	B.8	3.5	06/11/1999	1420	2840
Sub-Asphalt	1	B.8	4.5	06/11/1999	1580	3160
Sub-Asphalt	1	B.8	5	06/11/1999	1230	2460
Sub-Asphalt	1	B.8	16	06/02/1999	1730	3460
Sub-Asphalt	1	B.8	16.5	06/01/1999	1340	2680
Sub-Asphalt	1	B.8	17	06/01/1999	2480	4960
Sub-Asphalt	1	B.8	17.5	06/01/1999	2570	5140
Sub-Asphalt	2	B.8	18	06/01/1999	6000	6000
Sub-Asphalt	2	B.8	18.5	06/01/1999	4000	4000
Sub-Asphalt	2	B.8	19	06/01/1999	4000	4000
Sub-Asphalt	2	B.8	19.5	06/01/1999	5000	5000
Sub-Asphalt	2	B.8	20	06/01/1999	7000	7000
Sub-Asphalt	2	B.8	20.5	06/01/1999	3000	3000
Sub-Asphalt	2	B.8	21.2	06/01/1999	4000	4000
Sub-Asphalt	2	B.8	22	06/01/1999	3000	3000
Sub-Asphalt	1	C	4.5	06/11/1999	1530	3060
Sub-Asphalt	1	C	5	06/11/1999	1490	2980
Sub-Asphalt	1	C	5.5	06/11/1999	1980	3960
Sub-Asphalt	1	C	15.5	06/02/1999	2960	5920
Sub-Asphalt	1	C	16	06/02/1999	3760	7520
Sub-Asphalt	1	C	16.5	06/01/1999	1270	2540
Sub-Asphalt	1	C	17	06/01/1999	1450	2900
Sub-Asphalt	1	C	17.5	06/01/1999	2450	4900
Sub-Asphalt	2	C	17.5	06/01/1999	5000	5000
Sub-Asphalt	2	C	18	06/01/1999	7500	7500
Sub-Asphalt	2	C	18.5	06/01/1999	7000	7000
Sub-Asphalt	2	C	19	06/01/1999	5000	5000
Sub-Asphalt	2	C	19.5	06/01/1999	4000	4000
Sub-Asphalt	2	C	20	06/01/1999	4500	4500
Sub-Asphalt	2	C	20.5	06/01/1999	4000	4000
Sub-Asphalt	2	C	21.2	06/01/1999	4000	4000
Sub-Asphalt	2	C	22	06/01/1999	3000	3000
Sub-Asphalt	1	C.2	3	06/15/1999	1410	2820
Sub-Asphalt	1	C.2	3.5	06/11/1999	1400	2800
Sub-Asphalt	1	C.2	4	06/11/1999	1670	3340

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Table 4.1.1.1

Sub-Asphalt Results

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
Sub-Asphalt	1	C.2	4.5	06/11/1999	1770	3540
Sub-Asphalt	1	C.2	5	06/11/1999	1370	2740
Sub-Asphalt	1	C.2	5.5	06/11/1999	2010	4020
Sub-Asphalt	2	C.2	17.5	06/01/1999	4000	4000
Sub-Asphalt	2	C.2	18	06/01/1999	5000	5000
Sub-Asphalt	2	C.2	18.5	06/01/1999	4000	4000
Sub-Asphalt	2	C.2	19	06/01/1999	5000	5000
Sub-Asphalt	2	C.2	19.5	06/01/1999	4000	4000
Sub-Asphalt	2	C.2	20	06/01/1999	5000	5000
Sub-Asphalt	2	C.2	20.5	06/01/1999	4000	4000
Sub-Asphalt	2	C.2	21.2	06/01/1999	4000	4000
Sub-Asphalt	2	C.2	22	06/01/1999	4000	4000
Sub-Asphalt	2	C.5	20.5	06/01/1999	4000	4000
Sub-Asphalt	2	C.5	21.2	06/01/1999	4000	4000
Sub-Asphalt	2	C.5	22	06/01/1999	4000	4000
Sub-Asphalt	1	C.6	2.5	06/15/1999	1510	3020
Sub-Asphalt	1	C.6	3	06/15/1999	2580	5160
Sub-Asphalt	1	C.6	3.5	06/11/1999	1470	2940
Sub-Asphalt	1	C.6	4	06/11/1999	1460	2920
Sub-Asphalt	1	C.6	4.55	06/11/1999	1580	3160
Sub-Asphalt	2	C.6	5	06/01/1999	4000	4000
Sub-Asphalt	2	C.6	5.5	06/01/1999	4000	4000
Sub-Asphalt	2	C.6	6	06/01/1999	3500	3500
Sub-Asphalt	2	C.6	17.5	06/01/1999	3000	3000
Sub-Asphalt	2	C.6	18	06/01/1999	4000	4000
Sub-Asphalt	2	C.6	18.5	06/01/1999	4000	4000
Sub-Asphalt	2	C.6	19	06/01/1999	4000	4000
Sub-Asphalt	2	C.6	19.5	06/01/1999	4000	4000
Sub-Asphalt	2	C.6	20	06/01/1999	4000	4000
Sub-Asphalt	2	C.6	20.5	06/01/1999	4000	4000
Sub-Asphalt	2	C.6	21.2	06/01/1999	4000	4000
Sub-Asphalt	2	C.6	22	06/01/1999	4000	4000
Sub-Asphalt	1	C.8	1	06/15/1999	2040	4080
Sub-Asphalt	1	C.8	1.5	06/15/1999	1310	2620
Sub-Asphalt	1	C.8	2	06/15/1999	1380	3660
Sub-Asphalt	1	C.8	2.5	06/15/1999	2090	4180
Sub-Asphalt	1	C.8	3	06/15/1999	2070	4140
Sub-Asphalt	1	C.8	3.5	06/11/1999	1370	2740
Sub-Asphalt	1	C.8	4	06/11/1999	1400	2800
Sub-Asphalt	1	C.8	4.5	06/11/1999	1620	3240
Sub-Asphalt	2	C.8	5	06/01/1999	4000	4000
Sub-Asphalt	2	C.8	5.5	06/01/1999	3500	3500
Sub-Asphalt	2	C.8	6	06/01/1999	4000	4000
Sub-Asphalt	2	C.8	6.5	06/01/1999	4500	4500
Sub-Asphalt	2	C.8	17.5	06/01/1999	4000	4000
Sub-Asphalt	2	C.8	18	06/01/1999	4500	4500
Sub-Asphalt	2	C.8	18.5	06/01/1999	6000	6000
Sub-Asphalt	2	C.8	19	06/01/1999	4500	4500
Sub-Asphalt	2	C.8	19.5	06/01/1999	5000	5000

*1380
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2760

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Table 4.1.1.1

Sub-Asphalt Results

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
Sub-Asphalt	2	C.8	20	06/01/1999	4000	4000
Sub-Asphalt	1	D	1	06/15/1999	1410	2820
Sub-Asphalt	1	D	1.5	06/15/1999	1280	2560
Sub-Asphalt	1	D	2	06/15/1999	1660	3320
Sub-Asphalt	1	D	2.5	06/15/1999	2230	4460
Sub-Asphalt	1	D	3	06/15/1999	1610	3220
Sub-Asphalt	1	D	3.5	06/11/1999	1420	2840
Sub-Asphalt	1	D	4	06/11/1999	1490	2980
Sub-Asphalt	1	D	4.5	06/11/1999	1570	3140
Sub-Asphalt	2	D	5	06/01/1999	6000	6000
Sub-Asphalt	2	D	5.5	06/01/1999	6000	6000
Sub-Asphalt	1	D	6	06/05/1999	2070	4140
Sub-Asphalt	1	D	6.5	06/05/1999	1640	3280
Sub-Asphalt	1	D	7	06/05/1999	1590	3180
Sub-Asphalt	1	D	7.5	06/03/1999	1660	3320
Sub-Asphalt	1	D	8.2	06/03/1999	1350	2700
Sub-Asphalt	1	D	9	06/03/1999	1520	3040
Sub-Asphalt	1	D	9.5	06/03/1999	1450	2900
Sub-Asphalt	1	D	10	06/03/1999	1170	2340
Sub-Asphalt	1	D	10.5	06/03/1999	1050	2100
Sub-Asphalt	1	D	11	06/03/1999	1340	2680
Sub-Asphalt	1	D	11.5	06/03/1999	1330	2660
Sub-Asphalt	2	D	17.5	06/01/1999	4000	4000
Sub-Asphalt	2	D	18	06/01/1999	4000	4000
Sub-Asphalt	2	D	18.5	06/01/1999	5000	5000
Sub-Asphalt	2	D	19	06/01/1999	5000	5000
Sub-Asphalt	2	D	19.5	06/01/1999	4500	4500
Sub-Asphalt	1	D.2	1	06/14/1999	1370	2740
Sub-Asphalt	1	D.2	1.5	06/14/1999	1330	2660
Sub-Asphalt	1	D.2	2	06/14/1999	1590	3180
Sub-Asphalt	1	D.2	2.5	06/14/1999	1700	3400
Sub-Asphalt	1	D.2	3	06/14/1999	1790	3580
Sub-Asphalt	2	D.2	3.5	06/14/1999	7000	7000
Sub-Asphalt	1	D.2	4	06/11/1999	1260	2520
Sub-Asphalt	1	D.2	4.5	06/11/1999	1270	2540
Sub-Asphalt	1	D.2	5	06/11/1999	1430	2860
Sub-Asphalt	1	D.2	5.5	06/11/1999	1510	3020
Sub-Asphalt	1	D.2	6	06/11/1999	2120	4240
Sub-Asphalt	1	D.2	6.5	06/04/1999	1950	3900
Sub-Asphalt	1	D.2	7	06/04/1999	1690	3380
Sub-Asphalt	1	D.2	7.5	06/03/1999	1550	3100
Sub-Asphalt	1	D.2	8.2	06/03/1999	1520	3040
Sub-Asphalt	1	D.2	9	06/03/1999	1280	2560
Sub-Asphalt	1	D.2	9.5	06/03/1999	1310	2620
Sub-Asphalt	1	D.2	10	06/03/1999	2040	4080
Sub-Asphalt	1	D.2	10.5	06/03/1999	1690	3380
Sub-Asphalt	1	D.2	11	06/10/1999	4550	9100
Sub-Asphalt	1	D.2	11.5	06/03/1999	1310	2620
Sub-Asphalt	1	D.2	12	06/03/1999	1580	3160

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Table 4.1.1.1

Sub-Asphalt Results

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
Sub-Asphalt	1	D.2	12.5	06/03/1999	1580	3160
Sub-Asphalt	1	D.2	13	06/03/1999	1510	3020
Sub-Asphalt	1	D.2	13.5	06/03/1999	1330	2660
Sub-Asphalt	2	D.2	14	06/09/1999	Exclusion	Zone
Sub-Asphalt	1	D.2	14.5	06/02/1999	1410	2820
Sub-Asphalt	1	D.2	15	06/02/1999	1550	3100
Sub-Asphalt	1	D.2	15.5	06/02/1999	2090	4180
Sub-Asphalt	2	D.2	16	06/02/1999	4000	4000
Sub-Asphalt	2	D.2	16.5	06/02/1999	4000	4000
Sub-Asphalt	2	D.2	17	06/02/1999	5000	5000
Sub-Asphalt	2	D.2	17.5	06/02/1999	5000	5000
Sub-Asphalt	2	D.2	18	06/02/1999	7000	7000
Sub-Asphalt	2	D.2	18.5	06/01/1999	4450	4450
Sub-Asphalt	2	D.2	19	06/01/1999	4500	4500
Sub-Asphalt	2	D.2	19.5	06/01/1999	5000	5000
Sub-Asphalt	2	D.2	20	06/01/1999	4000	4000
Sub-Asphalt	1	D.5	1	06/14/1999	1570	3140
Sub-Asphalt	1	D.5	1.5	06/14/1999	1280	2560
Sub-Asphalt	1	D.5	2	06/14/1999	1600	3200
Sub-Asphalt	1	D.5	2.5	06/14/1999	1740	3480
Sub-Asphalt	1	D.5	3	06/14/1999	1860	3720
Sub-Asphalt	2	D.5	3.5	06/14/1999	4000	4000
Sub-Asphalt	2	D.5	4	06/14/1999	4000	4000
Sub-Asphalt	1	D.5	5	06/14/1999	1540	3080
Sub-Asphalt	1	D.5	5.5	06/14/1999	1510	3020
Sub-Asphalt	1	D.5	6	06/14/1999	5130	10260
Sub-Asphalt	1	D.5	6.5	06/05/1999	3230	6460
Sub-Asphalt	1	D.5	7	06/04/1999	1870	3740
Sub-Asphalt	1	D.5	7.5	06/03/1999	1720	3440
Sub-Asphalt	1	D.5	7.5	06/03/1999	1610	3220
Sub-Asphalt	1	D.5	8.2	06/03/1999	1390	2780
Sub-Asphalt	1	D.5	8.2	06/03/1999	1560	3120
Sub-Asphalt	1	D.5	9	06/03/1999	1070	2140
Sub-Asphalt	1	D.5	9.5	06/03/1999	1610	3220
Sub-Asphalt	1	D.5	10	06/03/1999	2520	5040
Sub-Asphalt	1	D.5	10.5	06/03/1999	1570	3140
Sub-Asphalt	1	D.5	11	06/03/1999	1610	3220
Sub-Asphalt	1	D.5	11.5	06/03/1999	1720	3440
Sub-Asphalt	2	D.5	12	06/08/1999	3900	3900
Sub-Asphalt	1	D.5	12.5	06/03/1999	1640	3280
Sub-Asphalt	1	D.5	13	06/03/1999	1580	3160
Sub-Asphalt	1	D.5	13.5	06/03/1999	1410	2820
Sub-Asphalt	1	D.5	14	06/02/1999	1850	3700
Sub-Asphalt	1	D.5	14.5	06/02/1999	1620	3240
Sub-Asphalt	1	D.5	15	06/02/1999	1940	3880
Sub-Asphalt	1	D.5	15.5	06/02/1999	2930	5860
Sub-Asphalt	2	D.5	16	06/02/1999	4000	4000
Sub-Asphalt	2	D.5	16.5	06/02/1999	5000	5000
Sub-Asphalt	2	D.5	17	06/02/1999	4000	4000

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Table 4.1.1.1

Sub-Asphalt Results

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
Sub-Asphalt	2	D.5	17.5	06/02/1999	4000	4000
Sub-Asphalt	2	D.5	18	06/01/1999	4000	4000
Sub-Asphalt	2	D.5	18	06/02/1999	5000	5000
Sub-Asphalt	2	D.5	18.5	06/01/1999	5000	5000
Sub-Asphalt	2	D.5	19	06/01/1999	4500	4500
Sub-Asphalt	2	D.5	19.5	06/01/1999	4500	4500
Sub-Asphalt	2	D.5	20	06/01/1999	4000	4000
Sub-Asphalt	1	D.8	1	06/25/1999	1800	3600
Sub-Asphalt	1	D.8	1.5	06/14/1999	1490	2980
Sub-Asphalt	1	D.8	2	06/14/1999	1590	3180
Sub-Asphalt	1	D.8	2.5	06/14/1999	1920	3840
Sub-Asphalt	1	D.8	3	06/14/1999	2090	4180
Sub-Asphalt	1	D.8	5	06/14/1999	1580	3160
Sub-Asphalt	1	D.8	5.5	06/14/1999	3840	7680
Sub-Asphalt	1	D.8	6	06/14/1999	4730	9460
Sub-Asphalt	1	D.8	7	06/04/1999	1820	3640
Sub-Asphalt	1	D.8	9	06/03/1999	1440	2880
Sub-Asphalt	1	D.8	9.5	06/03/1999	1420	2840
Sub-Asphalt	1	D.8	10	06/03/1999	2480	4960
Sub-Asphalt	1	D.8	10.5	06/03/1999	1730	3460
Sub-Asphalt	2	D.8	11	06/09/1999	4000	4000
Sub-Asphalt	1	D.8	11.5	06/03/1999	2830	5660
Sub-Asphalt	1	D.8	12.5	06/03/1999	3090	6180
Sub-Asphalt	1	D.8	13	06/03/1999	2170	4340
Sub-Asphalt	1	D.8	13.5	06/03/1999	2080	4160
Sub-Asphalt	1	D.8	14	06/02/1999	1830	3660
Sub-Asphalt	1	D.8	14.5	06/02/1999	1670	3340
Sub-Asphalt	1	D.8	15	06/02/1999	2270	4540
Sub-Asphalt	1	D.8	15.5	06/02/1999	3560	7120
Sub-Asphalt	2	D.8	16	06/02/1999	4000	4000
Sub-Asphalt	2	D.8	16.5	06/02/1999	5000	5000
Sub-Asphalt	2	D.8	17	06/02/1999	4000	4000
Sub-Asphalt	2	D.8	17.5	06/02/1999	5000	5000
Sub-Asphalt	2	D.8	18	06/01/1999	4000	4000
Sub-Asphalt	2	D.8	18	06/02/1999	4000	4000
Sub-Asphalt	2	D.8	18.5	06/01/1999	4500	4500
Sub-Asphalt	2	D.8	19	06/01/1999	4500	4500
Sub-Asphalt	2	D.8	19.5	06/01/1999	4500	4500
Sub-Asphalt	2	D.8	20	06/01/1999	4000	4000
Sub-Asphalt	1	E	1	06/25/1999	2290	4580
Sub-Asphalt	1	E	1.5	06/25/1999	1840	3680
Sub-Asphalt	1	E	2	06/25/1999	1750	3500
Sub-Asphalt	1	E	2.5	06/25/1999	2120	4240
Sub-Asphalt	1	E	3	06/25/1999	2910	5820
Sub-Asphalt	1	E	3.5	06/25/1999	2490	4980
Sub-Asphalt	1	E	5	06/25/1999	1870	3740
Sub-Asphalt	1	E	5.5	06/24/1999	2640	5280
Sub-Asphalt	1	E	6	06/24/1999	1940	3880
Sub-Asphalt	1	E	6.5	06/24/1999	1830	3660

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Table 4.1.1.1

Sub-Asphalt Results

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
Sub-Asphalt	1	E	7	06/24/1999	1980	3960
Sub-Asphalt	1	E	7.5	06/03/1999	2180	4360
Sub-Asphalt	1	E	8.2	06/03/1999	1510	3020
Sub-Asphalt	1	E	9	06/03/1999	1630	3260
Sub-Asphalt	1	E	9.5	06/03/1999	1980	3960
Sub-Asphalt	1	E	10	06/03/1999	1670	3340
Sub-Asphalt	1	E	10.5	06/03/1999	1720	3440
Sub-Asphalt	1	E	11	06/03/1999	2110	4220
Sub-Asphalt	1	E	11.5	06/03/1999	1720	3440
Sub-Asphalt	2	E	12	06/08/1999	3700	3700
Sub-Asphalt	1	E	12.5	06/03/1999	1610	3220
Sub-Asphalt	1	E	13	06/03/1999	1920	3840
Sub-Asphalt	1	E	13.5	06/03/1999	1760	3520
Sub-Asphalt	1	E	14	06/02/1999	2370	4740
Sub-Asphalt	1	E	14.5	06/02/1999	2330	4660
Sub-Asphalt	1	E	15	06/02/1999	1770	3540
Sub-Asphalt	1	E	15.5	06/02/1999	2890	5780
Sub-Asphalt	2	E	16	06/02/1999	4000	4000
Sub-Asphalt	2	E	16.5	06/02/1999	4000	4000
Sub-Asphalt	2	E	17	06/02/1999	4000	4000
Sub-Asphalt	2	E	17.5	06/02/1999	4000	4000
Sub-Asphalt	2	E	18	06/01/1999	4000	4000
Sub-Asphalt	2	E	18	06/02/1999	4000	4000
Sub-Asphalt	2	E	18.5	06/01/1999	4000	4000
Sub-Asphalt	2	E	19	06/01/1999	4000	4000
Sub-Asphalt	2	E	19.5	06/01/1999	4000	4000
Sub-Asphalt	2	E	20	06/01/1999	4000	4000
Sub-Asphalt	2	E	20.5	06/02/1999	5200	5200
Sub-Asphalt	2	E	21.2	06/02/1999	8500	8500
Sub-Asphalt	2	E	22	06/02/1999	7500	7500

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4.1.1.2 First Cut

The first cut of the site-wide excavation was approximately 18 inches to a maximum of 2 feet. The soil exposed after that cut was surveyed in a 5 meter grid and the results presented on the following table. All data are referred to as 2 feet which was the maximum depth of the cut for this survey. The instrumentation was the same as with the sub-asphalt survey, including the 30 second count for the Eberline which required the raw data to be multiplied by 2 to obtain CPM values. The CPM thresholds indicative of contamination remained the same as for the sub-asphalt survey.

Cells marked "Exclusion Zone" represent grid areas which were identified as contaminated extending from adjacent grid areas or from the survey in the overlying sub-asphalt screening and were not separately measured.

Table 4.1.1.2

First Cut

Depth Layer	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
2 Feet	1	A	14	06/10/1999	2630	5260
2 Feet	1	A	14.5	06/10/1999	3110	6220
2 Feet	1	A	15	06/10/1999	2320	4640
2 Feet	1	A	15.5	06/10/1999	2580	5160
2 Feet	1	A	16	06/10/1999	2300	4600
2 Feet	1	A	16.5	06/09/1999	1940	3880
2 Feet	1	A	17	06/09/1999	2890	3880
2 Feet	1	A	17.5	06/09/1999	2490	3880
2 Feet	1	A	18	06/09/1999	3320	3880
2 Feet	1	A	18.5	06/09/1999	2850	3880
2 Feet	1	A	19	06/09/1999	3000	3880
2 Feet	1	A	19.5	06/09/1999	3220	3880
2 Feet	1	A	20	06/09/1999	3110	3880
2 Feet	1	A	20.5	06/09/1999	2940	3880
2 Feet	1	A	21.2	06/09/1999	2720	3880
2 Feet	1	A	22	06/09/1999	2780	3880
2 Feet	1	A.2	14	06/10/1999	3910	7820
2 Feet	1	A.2	14.5	06/02/1999	2670	5340
2 Feet	1	A.2	15	06/02/1999	2240	4480
2 Feet	1	A.2	15.5	06/10/1999	1680	3360
2 Feet	1	A.2	16	06/10/1999	3320	6640
2 Feet	1	A.2	16.5	06/10/1999	2780	5560
2 Feet	1	A.2	17	06/10/1999	290	580
2 Feet	1	A.2	18.5	06/04/1999	5060	10120
2 Feet	1	A.2	19	06/02/1999	4720	9440
2 Feet	1	A.2	19.5	06/02/1999	3710	7420
2 Feet	1	A.2	20	06/02/1999	3620	7240
2 Feet	1	A.2	20.5	06/02/1999	3820	7640
2 Feet	2	A.2	21.2	06/02/1999	7500	7500
2 Feet	2	A.2	22	06/01/1999	8000	8000
2 Feet	1	A.4	15.5	06/10/1999	3060	6120
2 Feet	1	A.5	14	06/02/1999	1620	3240
2 Feet	1	A.5	14.5	06/02/1999	2650	5300
2 Feet	1	A.5	15	06/02/1999	2760	5520
2 Feet	1	A.5	15.5	06/10/1999	2800	5600
2 Feet	1	A.5	16	06/10/1999	5730	11460
2 Feet	1	A.5	16.5	06/10/1999	2140	4280
2 Feet	1	A.5	17	06/10/1999	N/A	N/A
2 Feet	1	A.5	18.5	06/04/1999	3790	7580
2 Feet	1	A.5	19	06/02/1999	4630	9260
2 Feet	1	A.5	19.5	06/02/1999	4000	8000
2 Feet	1	A.5	20	06/02/1999	3800	7600
2 Feet	1	A.5	20.5	06/02/1999	3230	6460
2 Feet	2	A.5	21.2	06/01/1999	Exclusion	Zone
2 Feet	2	A.5	22	06/01/1999	6000	6000
2 Feet	1	A.7	15	06/02/1999	1480	2960
2 Feet	1	A.7	16	06/10/1999	5140	10280
2 Feet	1	A.7	16.5	06/10/1999	3530	7060
2 Feet	1	A.7	17	06/10/1999	1820	3640

* 2890
 2490
 3320
 2850
 3000
 3220
 3110
 2940
 2720
 2780
 2850
 3000
 3220
 3110
 2940
 2720
 2780
 2780
 5780
 4980
 6640
 5700
 6000
 6440
 6220
 5380
 5440
 2780
 5560

Prepared By:

Table 4.1.1.2

First Cut

Depth Layer	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
2 Feet	1	A.7	18.5	06/04/1999	3790	7580
2 Feet	1	A.7	19	06/02/1999	4250	8500
2 Feet	1	A.7	19.35	06/02/1999	4320	8640
2 Feet	1	A.7	20	06/02/1999	4440	8880
2 Feet	1	A.7	20.5	06/02/1999	4000	8000
2 Feet	2	A.7	21.2	06/01/1999	9000	9000
2 Feet	2	A.7	22	06/01/1999	6000	6000
2 Feet	1	B	15.5	06/10/1999	2630	5260
2 Feet	1	B	16	06/10/1999	3300	6600
2 Feet	1	B	16.5	06/10/1999	2800	5600
2 Feet	1	B	17	06/10/1999	1690	3380
2 Feet	1	B	17.5	06/05/1999	1690	3380
2 Feet	1	B	18	06/02/1999	2700	5400
2 Feet	1	B	19.5	06/02/1999	4510	9020
2 Feet	1	B	20	06/02/1999	4270	8540
2 Feet	1	B	20.5	06/02/1999	4650	9300
2 Feet	2	B	21.2	06/01/1999	8000	8000
2 Feet	2	B	22	06/01/1999	3000	3000
2 Feet	1	B.2	15	06/02/1999	5440	10880
2 Feet	1	B.2	15.5	06/02/1999	3150	6300
2 Feet	1	B.2	16	06/05/1999	3320	6640
2 Feet	1	B.2	16.5	06/05/1999	3480	6960
2 Feet	1	B.2	17	06/05/1999	3720	7440
2 Feet	1	B.2	17.5	06/05/1999	3850	7700
2 Feet	1	B.2	18	06/02/1999	3570	7140
2 Feet	1	B.2	18.5	06/02/1999	3060	6120
2 Feet	1	B.2	19	06/02/1999	4100	8200
2 Feet	1	B.2	19.5	06/02/1999	3670	7340
2 Feet	1	B.2	20	06/02/1999	4170	8340
2 Feet	1	B.2	20.5	06/02/1999	43610	87220
2 Feet	2	B.2	21.2	06/01/1999	Exclusion	Zone
2 Feet	2	B.2	22	06/01/1999	700	700
2 Feet	1	B.4	1	06/22/1999	2070	4140
2 Feet	1	B.4	1.5	06/22/1999	4020	8040
2 Feet	1	B.4	2	06/22/1999	3130	6260
2 Feet	1	B.4	2.5	06/22/1999	3010	6020
2 Feet	1	B.4	15	06/02/1999	4950	9900
2 Feet	1	B.4	15.5	06/02/1999	2490	4980
2 Feet	1	B.4	16	06/05/1999	3260	6520
2 Feet	1	B.4	16.5	06/05/1999	3990	7980
2 Feet	1	B.4	17	06/05/1999	4510	9020
2 Feet	1	B.4	17.5	06/05/1999	3570	7140
2 Feet	1	B.4	18	06/02/1999	2800	5600
2 Feet	1	B.4	18.5	06/02/1999	2620	5240
2 Feet	1	B.4	19	06/02/1999	3630	7260
2 Feet	1	B.4	19.5	06/02/1999	2850	5700
2 Feet	1	B.4	20	06/02/1999	3860	7720
2 Feet	1	B.4	20.5	06/02/1999	3680	7360
2 Feet	2	B.4	21.2	06/01/1999	7000	7000

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Table 4.1.1.2

First Cut

Depth Layer	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
2 Feet	2	B.4	22	06/01/1999	7750	7750
2 Feet	1	B.8	1	06/22/1999	3960	7920
2 Feet	1	B.8	1.5	06/22/1999	5010	10020
2 Feet	1	B.8	2	06/22/1999	4340	8680
2 Feet	1	B.8	2.5	06/22/1999	3600	7200
2 Feet	1	B.8	3	06/22/1999	4920	9840
2 Feet	1	B.8	3.5	06/22/1999	3760	7520
2 Feet	1	B.8	15.5	06/02/1999	2760	5520
2 Feet	1	B.8	16.5	06/02/1999	2070	4140
2 Feet	1	B.8	17	06/05/1999	3230	6460
2 Feet	1	B.8	17.5	06/05/1999	3040	6080
2 Feet	1	B.8	18	06/02/1999	3490	6980
2 Feet	2	B.8	18.5	06/01/1999	4000	8000
2 Feet	1	B.8	19	06/02/1999	3270	6540
2 Feet	1	B.8	19.5	06/02/1999	3280	6560
2 Feet	1	B.8	20	06/02/1999	3670	7340
2 Feet	2	B.8	20.5	06/01/1999	8500	8500
2 Feet	2	B.8	21.2	06/01/1999	8000	8000
2 Feet	2	B.8	22	06/01/1999	5000	5000
2 Feet	1	C	1	06/24/1999	1870	3740
2 Feet	1	C	1.5	06/24/1999	2700	5400
2 Feet	1	C	2	06/24/1999	1920	3840
2 Feet	1	C	2.5	06/24/1999	1840	3680
2 Feet	1	C	3	06/18/1999	3140	6280
2 Feet	1	C	3.5	06/22/1999	3450	6900
2 Feet	1	C	4	06/22/1999	3880	7760
2 Feet	1	C	4.5	06/22/1999	4420	8840
2 Feet	1	C	5	06/22/1999	2850	5700
2 Feet	1	C	13	06/14/1999	3390	6780
2 Feet	2	C	13.5	06/08/1999	4000	4000
2 Feet	1	C	14	06/07/1999	2600	5200
2 Feet	1	C	14.5	06/07/1999	2140	4280
2 Feet	2	C	15	06/07/1999	5000	5000
2 Feet	1	C	15.5	06/02/1999	2380	4760
2 Feet	1	C	16.5	06/05/1999	2530	5060
2 Feet	1	C	17	06/05/1999	2190	4380
2 Feet	1	C	17.5	06/05/1999	2620	5240
2 Feet	1	C	18	06/03/1999	3310	6620
2 Feet	1	C	18.5	06/03/1999	3450	6900
2 Feet	1	C	19	06/03/1999	3370	6740
2 Feet	1	C	19.5	06/02/1999	3540	7080
2 Feet	1	C	20	06/02/1999	4120	8240
2 Feet	2	C	20.5	06/01/1999	8000	8000
2 Feet	2	C	21.2	06/01/1999	8000	8000
2 Feet	2	C	22	06/01/1999	10000	10000
2 Feet	1	C.2	1	06/24/1999	1770	3540
2 Feet	1	C.2	1.5	06/24/1999	1870	3740
2 Feet	1	C.2	2	06/24/1999	1870	3740
2 Feet	1	C.2	2.5	06/24/1999	1960	3920

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Table 4.1.1.2

First Cut

Depth Layer	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
2 Feet	1	C.2	3	06/22/1999	3470	6940
2 Feet	1	C.2	3.5	06/22/1999	3280	6560
2 Feet	1	C.2	4	06/22/1999	4120	8240
2 Feet	1	C.2	4.5	06/22/1999	4640	9280
2 Feet	1	C.2	5	06/22/1999	3540	7080
2 Feet	1	C.2	5.5	06/16/1999	2940	5880
2 Feet	1	C.2	6	06/16/1999	2870	5740
2 Feet	2	C.2	12.5	06/08/1999	4950	4950
2 Feet	2	C.2	13	06/08/1999	6000	6000
2 Feet	2	C.2	13.5	06/08/1999	5000	5000
2 Feet	1	C.2	14	06/07/1999	2580	5160
2 Feet	1	C.2	14.5	06/07/1999	1980	3960
2 Feet	1	C.2	15	06/07/1999	2030	4060
2 Feet	2	C.2	15.5	06/07/1999	6000	6000
2 Feet	1	C.2	16.5	06/05/1999	2950	5900
2 Feet	1	C.2	17	06/05/1999	2560	5120
2 Feet	1	C.2	17.5	06/05/1999	3030	6060
2 Feet	1	C.2	18	06/05/1999	2750	5500
2 Feet	1	C.2	18.5	06/03/1999	3150	6300
2 Feet	1	C.2	19	06/03/1999	3860	7720
2 Feet	1	C.2	19.5	06/03/1999	2700	5400
2 Feet	1	C.2	20	06/03/1999	3380	6760
2 Feet	2	C.2	20.5	06/01/1999	8000	8000
2 Feet	2	C.2	21.2	06/01/1999	5500	5500
2 Feet	2	C.2	22	06/01/1999	6000	6000
2 Feet	1	C.5	2	06/24/1999	3340	6680
2 Feet	1	C.6	2.5	06/24/1999	2460	4920
2 Feet	1	C.6	3	06/18/1999	1860	3720
2 Feet	1	C.6	3.5	06/18/1999	2650	5300
2 Feet	1	C.6	4	06/18/1999	2430	4860
2 Feet	1	C.6	4.5	06/16/1999	2710	5420
2 Feet	1	C.6	5	06/16/1999	2670	5340
2 Feet	1	C.6	5.5	06/16/1999	2250	4500
2 Feet	1	C.6	6	06/16/1999	2150	4300
2 Feet	1	C.6	11.5	06/14/1999	3910	7820
2 Feet	2	C.6	12	06/08/1999	7800	7800
2 Feet	2	C.6	12.5	06/08/1999	5000	5000
2 Feet	2	C.6	13	06/08/1999	5300	5300
2 Feet	2	C.6	13.5	06/08/1999	3900	3900
2 Feet	1	C.6	14	06/07/1999	2440	4880
2 Feet	1	C.6	14.5	06/07/1999	1870	3740
2 Feet	1	C.6	15	06/07/1999	1830	3660
2 Feet	2	C.6	15.5	06/07/1999	6000	6000
2 Feet	1	C.6	16	06/07/1999	2460	4920
2 Feet	1	C.6	16.5	06/05/1999	3130	6260
2 Feet	1	C.6	17	06/05/1999	3030	6060
2 Feet	1	C.6	17.5	06/05/1999	3760	7520
2 Feet	1	C.6	18	06/05/1999	3340	6680
2 Feet	1	C.6	18.5	06/03/1999	3130	6260

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Table 4.1.1.2

First Cut

Depth Layer	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
2 Feet	1	C.6	19	06/03/1999	3700	7400
2 Feet	1	C.6	19.5	06/03/1999	3040	6080
2 Feet	1	C.6	20	06/03/1999	3500	7000
2 Feet	2	C.6	20.5	06/01/1999	7000	7000
2 Feet	2	C.6	21.2	06/01/1999	6000	6000
2 Feet	2	C.6	22	06/01/1999	7000	7000
2 Feet	1	C.8	2	06/18/1999	2730	5460
2 Feet	1	C.8	2.5	06/18/1999	2490	4980
2 Feet	1	C.8	3	06/18/1999	2070	4140
2 Feet	1	C.8	3.5	06/18/1999	2460	4920
2 Feet	1	C.8	4	06/22/1999	3770	7540
2 Feet	1	C.8	4.5	06/16/1999	2690	5380
2 Feet	1	C.8	5	06/16/1999	2970	5940
2 Feet	1	C.8	5.5	06/16/1999	2270	4540
2 Feet	1	C.8	6	06/16/1999	2250	4500
2 Feet	1	C.8	6.5	06/16/1999	2580	5160
2 Feet	1	C.8	7	06/16/1999	3420	6840
2 Feet	1	C.8	11	06/14/1999	2130	4260
2 Feet	1	C.8	11.5	06/14/1999	3200	6400
2 Feet	2	C.8	12	06/08/1999	8200	8200
2 Feet	2	C.8	12.5	06/08/1999	4700	4700
2 Feet	2	C.8	13	06/08/1999	5400	5400
2 Feet	2	C.8	13.5	06/07/1999	5000	5000
2 Feet	2	C.8	14	06/07/1999	4500	4500
2 Feet	2	C.8	14.5	06/07/1999	5000	5000
2 Feet	2	C.8	15	06/07/1999	5000	5000
2 Feet	2	C.8	15.5	06/07/1999	6500	6500
2 Feet	1	C.8	16	06/07/1999	2430	4860
2 Feet	1	C.8	16.5	06/05/1999	2860	5720
2 Feet	1	C.8	17	06/05/1999	3050	6100
2 Feet	1	C.8	17.5	06/05/1999	2870	5740
2 Feet	1	C.8	18	06/03/1999	3440	6880
2 Feet	1	C.8	18.5	06/03/1999	2810	5620
2 Feet	1	C.8	19	06/03/1999	3030	6060
2 Feet	1	C.8	19.5	06/03/1999	2680	5360
2 Feet	1	C.8	20	06/03/1999	3950	7900
2 Feet	2	C.8	21.2	06/01/1999	6000	6000
2 Feet	2	C.8	22	06/01/1999	5000	5000
2 Feet	1	D	2	06/17/1999	2790	5580
2 Feet	1	D	2.5	06/17/1999	2180	4360
2 Feet	2	D	3	06/22/1999	6400	6400
2 Feet	2	D	3.5	06/22/1999	5600	5600
2 Feet	2	D	4	06/22/1999	6000	6000
2 Feet	1	D	4.5	06/16/1999	2680	5360
2 Feet	2	D	5	06/15/1999	3500	3500
2 Feet	2	D	5.5	06/15/1999	6000	6000
2 Feet	2	D	6	06/15/1999	6000	6000
2 Feet	2	D	6.5	06/15/1999	5000	5000
2 Feet	2	D	7	06/15/1999	6000	6000

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Table 4.1.1.2

First Cut

Depth Layer	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
2 Feet	2	D	7.5	06/15/1999	5000	5000
2 Feet	1	D	8.2	06/09/1999	2170	4340
2 Feet	1	D	9	06/11/1999	2200	4400
2 Feet	1	D	9.5	06/09/1999	2560	5120
2 Feet	1	D	10	06/09/1999	1210	2420
2 Feet	1	D	11	06/14/1999	4690	9380
2 Feet	2	D	11.5	06/07/1999	8000	8000
2 Feet	2	D	12	06/07/1999	6000	6000
2 Feet	2	D	12.5	06/07/1999	4800	4800
2 Feet	2	D	13	06/07/1999	5000	5000
2 Feet	2	D	13.5	06/07/1999	5000	5000
2 Feet	2	D	14	06/07/1999	5000	5000
2 Feet	2	D	14.5	06/07/1999	4500	4500
2 Feet	2	D	15	06/07/1999	4500	4500
2 Feet	2	D	15.5	06/07/1999	6000	6000
2 Feet	1	D	16	06/05/1999	2440	4880
2 Feet	1	D	16.5	06/05/1999	2790	5580
2 Feet	1	D	17	06/05/1999	3030	6060
2 Feet	1	D	18	06/03/1999	3240	6480
2 Feet	1	D	18.5	06/03/1999	Exclusion	Zone
2 Feet	1	D	19	06/03/1999	3030	6060
2 Feet	1	D	19.5	06/03/1999	2840	5680
2 Feet	1	D	20	06/03/1999	3110	6220
2 Feet	1	D	71.5	06/03/1999	3550	7100
2 Feet	1	D.	9	06/09/1999	2100	4200
2 Feet	2	D.2	1.5	06/07/1999	9500	9500
2 Feet	1	D.2	2	06/17/1999	2760	5520
2 Feet	1	D.2	2.5	06/17/1999	2510	5020
2 Feet	1	D.2	3	06/17/1999	2560	5120
2 Feet	1	D.2	3.5	06/17/1999	2820	5640
2 Feet	1	D.2	4	06/17/1999	3180	6360
2 Feet	1	D.2	4.5	06/16/1999	2700	5400
2 Feet	2	D.2	5	06/15/1999	5500	5500
2 Feet	2	D.2	5.5	06/15/1999	5000	5000
2 Feet	2	D.2	6	06/16/1999	9500	9500
2 Feet	2	D.2	6.5	06/16/1999	6200	6200
2 Feet	1	D.2	7	06/11/1999	2340	4680
2 Feet	1	D.2	7.5	06/09/1999	2650	5300
2 Feet	1	D.2	8.2	06/09/1999	2120	4240
2 Feet	1	D.2	9	06/01/1999	1560	3120
2 Feet	1	D.2	9.5	06/09/1999	2320	4640
2 Feet	1	D.2	10	06/09/1999	2760	5520
2 Feet	1	D.2	10.5	06/09/1999	2940	5880
2 Feet	1	D.2	11	06/09/1999	4070	8140
2 Feet	2	D.2	12	06/07/1999	7400	7400
2 Feet	2	D.2	12.5	06/07/1999	5000	5000
2 Feet	2	D.2	13	06/07/1999	5000	5000
2 Feet	2	D.2	13.5	06/07/1999	6000	6000
2 Feet	1	D.2	14	06/05/1999	2580	5160

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Table 4.1.1.2

First Cut

Depth Layer	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
2 Feet	1	D.2	14.5	06/05/1999	2240	4480
2 Feet	1	D.2	15	06/05/1999	2220	4440
2 Feet	1	D.2	15.5	06/05/1999	2230	4460
2 Feet	1	D.2	16	06/03/1999	3000	6000
2 Feet	1	D.2	16.5	06/03/1999	3090	6180
2 Feet	1	D.2	17	06/03/1999	3250	6500
2 Feet	1	D.2	17.5	06/03/1999	2990	5980
2 Feet	1	D.2	18	06/03/1999	3320	6640
2 Feet	1	D.2	18.5	06/03/1999	3330	6660
2 Feet	1	D.2	19	06/03/1999	5010	10020
2 Feet	1	D.2	19.5	06/03/1999	4190	8380
2 Feet	1	D.5	2	06/17/1999	2650	5300
2 Feet	1	D.5	2.5	06/17/1999	2840	5680
2 Feet	1	D.5	3	06/17/1999	3460	6920
2 Feet	1	D.5	3.5	06/17/1999	2250	4500
2 Feet	1	D.5	4	06/17/1999	3160	6320
2 Feet	1	D.5	4.5	06/17/1999	1810	3620
2 Feet	2	D.5	5	06/15/1999	6000	6000
2 Feet	2	D.5	5.5	06/15/1999	7000	7000
2 Feet	2	D.5	6	06/16/1999	11000	11000
2 Feet	2	D.5	6.5	06/16/1999	9000	9000
2 Feet	1	D.5	7	06/11/1999	2200	4400
2 Feet	1	D.5	7.5	06/09/1999	2020	4040
2 Feet	1	D.5	8.2	06/09/1999	2270	4540
2 Feet	1	D.5	9	06/09/1999	2130	4260
2 Feet	1	D.5	9.5	06/09/1999	2340	4680
2 Feet	2	D.5	10	06/08/1999	8000	8000
2 Feet	2	D.5	10.5	06/08/1999	10000	10000
2 Feet	2	D.5	11	06/08/1999	10000	10000
2 Feet	2	D.5	11.5	06/08/1999	8000	8000
2 Feet	2	D.5	13	06/07/1999	5000	5000
2 Feet	2	D.5	13.5	06/07/1999	5000	5000
2 Feet	1	D.5	14	06/05/1999	2720	5440
2 Feet	1	D.5	14.5	06/05/1999	2100	4200
2 Feet	1	D.5	15	06/05/1999	2340	4680
2 Feet	1	D.5	15.5	06/05/1999	2340	4680
2 Feet	1	D.5	16	06/03/1999	2910	5820
2 Feet	1	D.5	16.5	06/03/1999	3070	6140
2 Feet	1	D.5	17	06/03/1999	2520	5040
2 Feet	1	D.5	17.5	06/03/1999	3000	6000
2 Feet	1	D.5	18	06/03/1999	3190	6380
2 Feet	1	D.5	18.5	06/03/1999	3070	6140
2 Feet	1	D.5	19	06/03/1999	4730	9460
2 Feet	1	D.5	19.5	06/03/1999	3910	7820
2 Feet	1	D.8	1	06/03/1999	4360	8720
2 Feet	1	D.8	2	06/17/1999	2940	5880
2 Feet	1	D.8	2.5	06/17/1999	2570	5140
2 Feet	1	D.8	3	06/17/1999	2700	5400
2 Feet	2	D.8	3.5	06/22/1999	6000	6000

Prepared By:

Table 4.1.1.2

First Cut

Depth Layer	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
2 Feet	2	D.8	4.5	06/22/1999	4400	4400
2 Feet	2	D.8	5	06/15/1999	6000	6000
2 Feet	2	D.8	5.5	06/15/1999	6000	6000
2 Feet	2	D.8	6	06/16/1999	9500	9500
2 Feet	2	D.8	6.5	06/16/1999	11500	11500
2 Feet	2	D.8	7	06/16/1999	6000	6000
2 Feet	1	D.8	7.5	06/09/1999	2220	4440
2 Feet	1	D.8	8.2	06/09/1999	1780	3560
2 Feet	1	D.8	9.5	06/09/1999	2460	4920
2 Feet	2	D.8	10	06/08/1999	6000	6000
2 Feet	2	D.8	10.5	06/08/1999	8000	8000
2 Feet	2	D.8	11	06/08/1999	8000	8000
2 Feet	1	D.8	14	06/05/1999	2550	5100
2 Feet	1	D.8	14.5	06/05/1999	2330	4660
2 Feet	1	D.8	15	06/05/1999	2680	5360
2 Feet	1	D.8	15.5	06/05/1999	2320	4640
2 Feet	1	D.8	16	06/03/1999	3190	6380
2 Feet	1	D.8	16.5	06/03/1999	3750	7500
2 Feet	1	D.8	17	06/03/1999	2790	5580
2 Feet	1	D.8	17.5	06/03/1999	2840	5680
2 Feet	1	D.8	18	06/03/1999	3130	6260
2 Feet	1	D.8	18.5	06/03/1999	2990	5980
2 Feet	1	D.8	19.5	06/03/1999	3550	7100
2 Feet	1	E	1	06/25/1999	2680	5360
2 Feet	1	E	1.5	06/25/1999	1850	3700
2 Feet	1	E	2	06/17/1999	3650	7300
2 Feet	1	E	2.5	06/17/1999	2970	5940
2 Feet	2	E	3	06/22/1999	6800	6800
2 Feet	2	E	3.5	06/22/1999	6400	6400
2 Feet	2	E	5	06/22/1999	4000	4000
2 Feet	1	E	5.5	06/25/1999	2640	5280
2 Feet	2	E	6	06/16/1999	7000	7000
2 Feet	1	E	6.5	06/25/1999	3180	6360
2 Feet	1	E	7	06/25/1999	2880	5760
2 Feet	1	E	7.5	06/14/1999	4000	8000
2 Feet	1	E	8.2	06/09/1999	1640	3280
2 Feet	1	E	9	06/09/1999	1840	3680
2 Feet	1	E	9.5	06/09/1999	2160	4320
2 Feet	2	E	10	06/08/1999	5000	5000
2 Feet	2	E	10.5	06/08/1999	6000	6000
2 Feet	2	E	11	06/08/1999	6000	6000
2 Feet	2	E	13	06/08/1999	5000	5000
2 Feet	2	E	13.5	06/08/1999	5700	5700
2 Feet	2	E	14	06/08/1999	5000	5000
2 Feet	1	E	16	06/03/1999	3450	6900
2 Feet	1	E	16.5	06/03/1999	2630	5260
2 Feet	1	E	17	06/03/1999	3070	6140
2 Feet	1	E	17.5	06/03/1999	3180	6360
2 Feet	1	E	18	06/03/1999	3530	7060

Prepared By:

Table 4.1.1.2

First Cut

Depth Layer	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
2 Feet	1	E	18.5	06/03/1999	3280	6560
2 Feet	1	E	19	06/03/1999	4640	9280
2 Feet	1	E	19.5	06/03/1999	3970	7940

Prepared By:

4.1.1.3 Second Cut

The second cut of the site-wide excavation removed an additional 18 inches to a maximum of 2 feet of soil. The survey data collected at this interval is designated 3.5 feet on the following table. As with surveys of overlying material, data was collected on 5 meter grids, using Eberline ESP-1 and Ludlum 193 instruments. Eberline counts for 30 second readings were multiplied by 2 to obtain CPM values. The CPM values indicative of potential contamination are as for overlying materials.

Table 4.1.1.3

Second Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
3.5 Feet	1	A	1.5	06/11/1999	2670	5340
3.5 Feet	1	A	12	06/11/1999	2160	4320
3.5 Feet	1	A	13	06/11/1999	2290	4580
3.5 Feet	2	A	14	06/11/1999	6000	6000
3.5 Feet	2	A	14.5	06/11/1999	5100	5100
3.5 Feet	2	A	15	06/11/1999	5000	5000
3.5 Feet	2	A	15.5	06/11/1999	4500	4500
3.5 Feet	2	A	16	06/11/1999	4500	4500
3.5 Feet	2	A	16.5	06/11/1999	4000	4000
3.5 Feet	1	A	17	06/10/1999	3780	7560
3.5 Feet	1	A	17.5	06/09/1999	3350	6700
3.5 Feet	1	A	18	06/09/1999	3360	6720
3.5 Feet	1	A	18.5	06/09/1999	3570	7140
3.5 Feet	1	A	19	06/09/1999	3020	6040
3.5 Feet	1	A	19.5	06/09/1999	3520	6960
3.5 Feet	1	A	20	06/09/1999	3620	6960
3.5 Feet	1	A	20.5	06/09/1999	2220	6960
3.5 Feet	1	A	21.2	06/09/1999	2200	6960
3.5 Feet	1	A	22	06/09/1999	3400	6960
3.5 Feet	2	A.2	14.5	06/11/1999	3800	3800
3.5 Feet	2	A.2	15	06/11/1999	4000	4000
3.5 Feet	2	A.2	15.5	06/11/1999	4200	4200
3.5 Feet	2	A.2	16	06/11/1999	4200	4200
3.5 Feet	2	A.2	16.5	06/11/1999	4300	4300
3.5 Feet	2	A.2	17	06/11/1999	3900	3900
3.5 Feet	1	A.2	18	06/04/1999	4060	8120
3.5 Feet	1	A.2	18.5	06/04/1999	5060	10120
3.5 Feet	1	A.2	19	06/04/1999	4340	8680
3.5 Feet	1	A.2	19.5	06/04/1999	3990	7980
3.5 Feet	1	A.2	20	06/04/1999	3410	6820
3.5 Feet	1	A.2	20.5	06/04/1999	2040	4080
3.5 Feet	1	A.2	21.2	06/04/1999	3970	7940
3.5 Feet	1	A.2	22	06/04/1999	3840	7680
3.5 Feet	2	A.5	14.5	06/11/1999	4000	4000
3.5 Feet	2	A.5	15	06/11/1999	3800	3800
3.5 Feet	2	A.5	15.5	06/11/1999	4100	4100
3.5 Feet	2	A.5	16	06/11/1999	4200	4200
3.5 Feet	2	A.5	16.5	06/11/1999	4100	4100
3.5 Feet	2	A.5	17	06/11/1999	4500	4500
3.5 Feet	1	A.5	17.5	06/07/1999	1610	3220
3.5 Feet	1	A.5	18	06/04/1999	3380	6760
3.5 Feet	1	A.5	18.5	06/04/1999	4650	9300
3.5 Feet	1	A.5	19	06/04/1999	4200	8400
3.5 Feet	1	A.5	19.5	06/04/1999	2890	5780
3.5 Feet	1	A.5	20	06/04/1999	4000	8000
3.5 Feet	1	A.5	20.5	06/04/1999	4610	9220
3.5 Feet	1	A.5	21.2	06/04/1999	3470	6940
3.5 Feet	1	A.5	22	06/04/1999	2780	5560
3.5 Feet	2	A.7	15	06/11/1999	3200	3200

3520 x2 7040
 3620 7240
 2220 4440
 2200 4400
 3400 6800

Prepared By:

Table 4.1.1.3

Second Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
3.5 Feet	1	A.7	16	06/07/1999	2930	5860
3.5 Feet	1	A.7	16.5	06/07/1999	2390	4780
3.5 Feet	1	A.7	17	06/07/1999	1410	2820
3.5 Feet	1	A.7	17.5	06/07/1999	1540	6960
3.5 Feet	1	A.7	18	06/04/1999	4080	8160
3.5 Feet	1	A.7	19	06/04/1999	4240	8480
3.5 Feet	1	A.7	19.5	06/04/1999	4540	9080
3.5 Feet	1	A.7	20	06/04/1999	4090	8180
3.5 Feet	1	A.7	20.5	06/04/1999	4620	9240
3.5 Feet	1	A.7	21.2	06/04/1999	3830	7660
3.5 Feet	1	A.7	22	06/04/1999	3350	6700
3.5 Feet	1	A7	18.5	06/04/1999	4150	8300
3.5 Feet	1	B	15.5	06/23/1999	1430	2860
3.5 Feet	1	B	16	06/07/1999	2630	6960
3.5 Feet	1	B	16.5	06/07/1999	2270	6960
3.5 Feet	1	B	17	06/07/1999	1580	6960
3.5 Feet	1	B	17.5	06/07/1999	1580	6960
3.5 Feet	2	B	18	06/09/1999	5500	5500
3.5 Feet	2	B	18.5	06/09/1999	7000	7000
3.5 Feet	2	B	19	06/09/1999	6500	6500
3.5 Feet	1	B	19.5	06/04/1999	4290	6960
3.5 Feet	1	B	20	06/04/1999	4120	8240
3.5 Feet	1	B	20.5	06/04/1999	4120	8240
3.5 Feet	1	B	21.2	06/04/1999	2320	4640
3.5 Feet	1	B	22	06/04/1999	3120	6240
3.5 Feet	1	B.2	15.5	06/23/1999	1940	3880
3.5 Feet	2	B.2	16	06/05/1999	3290	3290
3.5 Feet	1	B.2	16.5	06/05/1999	3480	6960
3.5 Feet	2	B.2	17	06/05/1999	5900	5900
3.5 Feet	2	B.2	17.5	06/05/1999	5500	5500
3.5 Feet	2	B.2	18	06/05/1999	8000	8000
3.5 Feet	1	B.2	18.5	06/04/1999	5010	6960
3.5 Feet	1	B.2	19	06/04/1999	4870	6960
3.5 Feet	1	B.2	19.5	06/04/1999	4080	6960
3.5 Feet	1	B.2	20	06/04/1999	4220	6960
3.5 Feet	2	B.2	20.5	06/03/1999	6800	6800
3.5 Feet	2	B.2	21.2	06/03/1999	6900	6900
3.5 Feet	2	B.2	22	06/03/1999	6000	6000
3.5 Feet	1	B.4	1	06/23/1999	2630	5260
3.5 Feet	1	B.4	1.5	06/23/1999	2910	5820
3.5 Feet	1	B.4	2	06/23/1999	2980	5960
3.5 Feet	1	B.4	2.5	06/23/1999	3280	6560
3.5 Feet	1	B.4	3	06/23/1999	2600	5200
3.5 Feet	1	B.4	3.5	06/23/1999	2120	4240
3.5 Feet	2	B.4	15	06/08/1999	8000	8000
3.5 Feet	2	B.4	15.5	06/08/1999	7000	7000
3.5 Feet	1	B.4	16	06/04/1999	3490	6960
3.5 Feet	1	B.4	16.5	06/04/1999	3990	6960
3.5 Feet	1	B.4	17	06/04/1999	4510	6960

$\times 2$
 4080 8160
 4220 8440
 3490 6980
 3990 7980
 4510 9020

$\times 2$
 1540 3080
 2630 5260
 2270 4540
 1580 3160
 1580 3160
 4290 8580
 5010 10020
 4870 9740

Prepared By:

Table 4.1.1.3

Second Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
3.5 Feet	1	B.4	17.5	06/04/1999	3570	6960
3.5 Feet	2	B.4	18	06/05/1999	7000	7000
3.5 Feet	1	B.4	18.5	06/04/1999	4950	6960
3.5 Feet	1	B.4	19	06/04/1999	3780	6960
3.5 Feet	1	B.4	19.5	06/04/1999	4140	6960
3.5 Feet	1	B.4	20	06/04/1999	4410	6960
3.5 Feet	2	B.4	20.5	06/03/1999	4240	4240
3.5 Feet	2	B.4	21.2	06/03/1999	8000	8000
3.5 Feet	2	B.4	22	06/03/1999	7800	7800
3.5 Feet	1	B.8	1	06/23/1999	3570	7140
3.5 Feet	1	B.8	1.5	06/23/1999	3210	6420
3.5 Feet	1	B.8	2	06/23/1999	3520	7040
3.5 Feet	1	B.8	2.5	06/23/1999	1840	3680
3.5 Feet	1	B.8	3	06/23/1999	2250	4500
3.5 Feet	1	B.8	3.5	06/23/1999	2610	5220
3.5 Feet	2	B.8	15	06/08/1999	7000	7000
3.5 Feet	2	B.8	15.5	06/08/1999	6000	6000
3.5 Feet	1	B.8	16	06/07/1999	2800	5600
3.5 Feet	1	B.8	16.5	06/05/1999	2070	4140
3.5 Feet	1	B.8	17	06/05/1999	3230	6460
3.5 Feet	1	B.8	17.5	06/05/1999	3040	6080
3.5 Feet	2	B.8	18	06/05/1999	6000	6000
3.5 Feet	1	B.8	18.5	06/04/1999	3950	6960
3.5 Feet	1	B.8	19	06/04/1999	3920	6960
3.5 Feet	1	B.8	19.5	06/04/1999	3760	6960
3.5 Feet	1	B.8	20	06/04/1999	4160	6960
3.5 Feet	2	B.8	20.5	06/03/1999	6000	6000
3.5 Feet	2	B.8	21.2	06/03/1999	8400	8400
3.5 Feet	2	B.8	22	06/03/1999	8000	8000
3.5 Feet	1	C	1	06/24/1999	4660	9320
3.5 Feet	1	C	1.5	06/24/1999	3640	7280
3.5 Feet	1	C	2	06/24/1999	2950	5900
3.5 Feet	1	C	2.5	06/22/1999	2750	5500
3.5 Feet	1	C	3	06/22/1999	2500	5000
3.5 Feet	1	C	3.5	06/22/1999	2560	5120
3.5 Feet	1	C	4	06/22/1999	3210	6420
3.5 Feet	1	C	4.5	06/22/1999	2710	5420
3.5 Feet	1	C	5	06/22/1999	4070	8140
3.5 Feet	1	C	11	06/14/1999	1440	2880
3.5 Feet	1	C	11.5	06/14/1999	1400	2800
3.5 Feet	1	C	12	06/14/1999	1530	3060
3.5 Feet	1	C	12.5	06/14/1999	1410	2820
3.5 Feet	1	C	14	06/23/1999	4580	9160
3.5 Feet	1	C	14.5	06/23/1999	2640	5280
3.5 Feet	2	C	15.5	06/08/1999	4000	4000
3.5 Feet	2	C	16	06/05/1999	4000	4000
3.5 Feet	1	C	16.5	06/05/1999	2530	5060
3.5 Feet	2	C	17	06/05/1999	3700	3700
3.5 Feet	2	C	17.5	06/05/1999	4000	4000

4160 x2 8320

3570 x2 7140
 4950 9900
 3780 7560
 4140 8280
 4410 8820
 3950 7900
 3920 7840
 3760 7520

Prepared By:

Table 4.1.1.3

Second Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
3.5 Feet	2	C	18	06/05/1999	4100	4100
3.5 Feet	1	C	18.5	06/04/1999	3140	6280
3.5 Feet	1	C	19	06/04/1999	3430	6960
3.5 Feet	1	C	19.5	06/04/1999	4040	8080
3.5 Feet	1	C	20	06/04/1999	4690	6960
3.5 Feet	2	C	20.5	06/03/1999	6500	6500
3.5 Feet	2	C	21.2	06/03/1999	8400	8400
3.5 Feet	2	C	22	06/03/1999	8000	8000
3.5 Feet	1	C.2	1	06/24/1999	4350	8700
3.5 Feet	1	C.2	1.5	06/24/1999	3310	6620
3.5 Feet	1	C.2	2	06/24/1999	3490	6980
3.5 Feet	1	C.2	2.5	06/22/1999	3850	7700
3.5 Feet	1	C.2	3	06/22/1999	3140	6280
3.5 Feet	1	C.2	3.5	06/22/1999	3260	6520
3.5 Feet	1	C.2	4	06/22/1999	3230	6460
3.5 Feet	1	C.2	4.5	06/22/1999	2680	5360
3.5 Feet	1	C.2	5	06/22/1999	5010	10020
3.5 Feet	1	C.2	5.5	06/22/1999	3630	7260
3.5 Feet	2	C.2	10	06/15/1999	4000	4000
3.5 Feet	2	C.2	10.5	06/15/1999	3000	3000
3.5 Feet	1	C.2	11	06/14/1999	1560	3120
3.5 Feet	1	C.2	11.5	06/14/1999	1840	3680
3.5 Feet	1	C.2	12	06/14/1999	1880	3760
3.5 Feet	1	C.2	12.5	06/14/1999	1900	3800
3.5 Feet	1	C.2	14	06/10/1999	2610	5220
3.5 Feet	1	C.2	14.5	06/23/1999	2920	5840
3.5 Feet	1	C.2	15	06/23/1999	2820	5640
3.5 Feet	2	C.2	15.5	06/08/1999	7000	7000
3.5 Feet	1	C.2	16	06/05/1999	5320	10640
3.5 Feet	1	C.2	16.5	06/05/1999	4070	8140
3.5 Feet	1	C.2	17	06/05/1999	4770	9540
3.5 Feet	1	C.2	17.5	06/05/1999	4130	8260
3.5 Feet	1	C.2	18	06/04/1999	3470	6940
3.5 Feet	1	C.2	18.5	06/04/1999	3610	7220
3.5 Feet	1	C.2	19	06/04/1999	3370	6740
3.5 Feet	1	C.2	19.5	06/04/1999	3030	6060
3.5 Feet	1	C.2	20	06/04/1999	3240	6480
3.5 Feet	2	C.2	20.5	06/05/1999	6400	6400
3.5 Feet	2	C.2	21.2	06/03/1999	6400	6400
3.5 Feet	2	C.2	22	06/03/1999	8000	8000
3.5 Feet	1	C.6	2	06/24/1999	2740	5480
3.5 Feet	1	C.6	2.5	06/22/1999	3870	7740
3.5 Feet	1	C.6	3	06/22/1999	3660	7320
3.5 Feet	1	C.6	3.5	06/22/1999	3420	6840
3.5 Feet	1	C.6	4	06/22/1999	3170	6340
3.5 Feet	1	C.6	4.5	06/22/1999	2940	5880
3.5 Feet	1	C.6	5	06/22/1999	2210	4420
3.5 Feet	1	C.6	5.5	06/16/1999	2750	5500
3.5 Feet	1	C.6	6	06/16/1999	2950	5900

3430
 4690
 x2
 6860
 9380

Prepared By:

Table 4.1.1.3

Second Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
3.5 Feet	2	C.6	10	06/15/1999	5000	5000
3.5 Feet	2	C.6	10.5	06/15/1999	6000	6000
3.5 Feet	1	C.6	11	06/14/1999	1730	3460
3.5 Feet	1	C.6	11.5	06/14/1999	2240	4480
3.5 Feet	1	C.6	12	06/14/1999	3880	7760
3.5 Feet	1	C.6	12.5	06/14/1999	2540	5080
3.5 Feet	1	C.6	13	06/10/1999	3960	7920
3.5 Feet	1	C.6	13.5	06/10/1999	3780	7560
3.5 Feet	1	C.6	14	06/10/1999	3060	6120
3.5 Feet	1	C.6	14.5	06/10/1999	3180	6360
3.5 Feet	2	C.6	15	06/08/1999	5000	5000
3.5 Feet	2	C.6	15.5	06/08/1999	6000	6000
3.5 Feet	1	C.6	16	06/05/1999	4640	9280
3.5 Feet	1	C.6	16.5	06/05/1999	3650	7300
3.5 Feet	1	C.6	17	06/05/1999	5320	10640
3.5 Feet	1	C.6	17.5	06/05/1999	4160	8320
3.5 Feet	1	C.6	18	06/04/1999	3320	6640
3.5 Feet	1	C.6	18.5	06/04/1999	2880	5760
3.5 Feet	1	C.6	19	06/04/1999	2920	5840
3.5 Feet	1	C.6	19.5	06/04/1999	3020	6040
3.5 Feet	1	C.6	20	06/04/1999	3510	7020
3.5 Feet	2	C.6	20.5	06/05/1999	5250	5250
3.5 Feet	2	C.6	21.2	06/03/1999	6000	6000
3.5 Feet	2	C.6	22	06/03/1999	6800	6800
3.5 Feet	1	C.8	2	06/24/1999	2990	5980
3.5 Feet	1	C.8	2.5	06/22/1999	3830	7660
3.5 Feet	1	C.8	3	06/22/1999	3540	7080
3.5 Feet	1	C.8	3.5	06/22/1999	3890	7780
3.5 Feet	1	C.8	4	06/22/1999	3660	7320
3.5 Feet	1	C.8	4.5	06/22/1999	3120	6240
3.5 Feet	1	C.8	5	06/22/1999	2420	4840
3.5 Feet	1	C.8	5.5	06/16/1999	2530	5060
3.5 Feet	1	C.8	6	06/16/1999	2720	5440
3.5 Feet	1	C.8	6.5	06/16/1999	1820	3640
3.5 Feet	2	C.8	6.5	06/15/1999	4000	4000
3.5 Feet	1	C.8	7	06/16/1999	2300	4600
3.5 Feet	1	C.8	9	06/15/1999	1270	2540
3.5 Feet	2	C.8	10	06/15/1999	5000	5000
3.5 Feet	2	C.8	10.5	06/15/1999	6000	6000
3.5 Feet	1	C.8	11	06/14/1999	2240	4480
3.5 Feet	1	C.8	11.5	06/14/1999	4500	9000
3.5 Feet	1	C.8	12	06/14/1999	3770	7540
3.5 Feet	1	C.8	12.5	06/14/1999	3280	6560
3.5 Feet	1	C.8	13	06/10/1999	3780	7560
3.5 Feet	1	C.8	13.5	06/10/1999	6500	13000
3.5 Feet	1	C.8	14	06/10/1999	3150	6300
3.5 Feet	1	C.8	14.5	06/10/1999	2690	5380
3.5 Feet	2	C.8	15	06/08/1999	3000	3000
3.5 Feet	2	C.8	15.5	06/08/1999	5000	5000

Prepared By:

Table 4.1.1.3

Second Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
3.5 Feet	1	C.8	16	06/05/1999	4900	9800
3.5 Feet	1	C.8	16.5	06/05/1999	4190	8380
3.5 Feet	1	C.8	17	06/05/1999	4330	8660
3.5 Feet	1	C.8	17.5	06/05/1999	5530	11060
3.5 Feet	1	C.8	18	06/04/1999	3650	7300
3.5 Feet	1	C.8	18.5	06/04/1999	2650	5300
3.5 Feet	1	C.8	19	06/04/1999	2990	5980
3.5 Feet	1	C.8	19.5	06/04/1999	2850	5700
3.5 Feet	1	C.8	20	06/04/1999	3270	6540
3.5 Feet	2	C.8	20.5	06/08/1999	4000	4000
3.5 Feet	2	C.8	21.2	06/08/1999	3000	3000
3.5 Feet	2	C.8	22	06/08/1999	4000	4000
3.5 Feet	1	D	2	06/17/1999	3050	6100
3.5 Feet	1	D	2.5	06/17/1999	2740	5480
3.5 Feet	1	D	3	06/17/1999	2730	5460
3.5 Feet	1	D	3.5	06/17/1999	3340	6680
3.5 Feet	1	D	4	06/17/1999	3220	3440
3.5 Feet	1	D	4.5	06/17/1999	2690	5380
3.5 Feet	1	D	5.5	06/16/1999	2880	5760
3.5 Feet	1	D	6	06/16/1999	2480	4960
3.5 Feet	1	D	7.5	06/22/1999	4680	9360
3.5 Feet	1	D	9	06/15/1999	3120	6240
3.5 Feet	1	D	9.5	06/15/1999	2880	5760
3.5 Feet	1	D	10	06/15/1999	2460	4920
3.5 Feet	1	D	10.5	06/15/1999	3440	6880
3.5 Feet	1	D	11	06/14/1999	3190	6380
3.5 Feet	1	D	11.5	06/14/1999	3830	7660
3.5 Feet	1	D	13	06/10/1999	3540	7080
3.5 Feet	1	D	13.5	06/10/1999	5140	10280
3.5 Feet	1	D	14	06/10/1999	4970	9940
3.5 Feet	1	D	14.5	06/10/1999	3150	6300
3.5 Feet	1	D	15	06/08/1999	2780	5560
3.5 Feet	1	D	15.5	06/08/1999	2300	4600
3.5 Feet	1	D	16	06/05/1999	4590	9180
3.5 Feet	1	D	16.5	06/05/1999	4030	8060
3.5 Feet	1	D	17	06/05/1999	5730	11460
3.5 Feet	1	D	17.5	06/05/1999	4400	8800
3.5 Feet	1	D	18	06/08/1999	2170	4340
3.5 Feet	1	D	18.5	06/08/1999	2830	5660
3.5 Feet	1	D	19	06/08/1999	3030	6060
3.5 Feet	1	D	19.5	06/04/1999	2300	4600
3.5 Feet	1	D	20	06/04/1999	2560	5120
3.5 Feet	1	D	20.5	06/08/1999	2460	4920
3.5 Feet	1	D	21.2	06/08/1999	EXCLUSION	ZONE
3.5 Feet	1	D	22	06/08/1999	2300	4600
3.5 Feet	1	D.2	2	06/17/1999	3070	6140
3.5 Feet	1	D.2	2.5	06/17/1999	1660	3320
3.5 Feet	1	D.2	3	06/17/1999	2870	5740
3.5 Feet	1	D.2	3.5	06/17/1999	2890	5780

3220 ^{x2} 6440

Prepared By:

Table 4.1.1.3

Second Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
3.5 Feet	1	D.2	4	06/17/1999	2700	5400
3.5 Feet	1	D.2	4.5	06/17/1999	2470	4940
3.5 Feet	2	D.2	5	06/21/1999	4000	4000
3.5 Feet	1	D.2	5.5	06/19/1999	3480	6960
3.5 Feet	1	D.2	6	06/16/1999	3330	6660
3.5 Feet	1	D.2	6.5	06/16/1999	2170	4340
3.5 Feet	1	D.2	7	06/16/1999	1820	3620
3.5 Feet	2	D.2	7.5	06/14/1999	6000	6000
3.5 Feet	1	D.2	9	06/15/1999	2970	5940
3.5 Feet	1	D.2	9.5	06/15/1999	3360	6720
3.5 Feet	2	D.2	10	06/14/1999	7000	7000
3.5 Feet	2	D.2	10.5	06/14/1999	7000	7000
3.5 Feet	1	D.2	11	06/14/1999	5000	10000
3.5 Feet	1	D.2	11.5	06/14/1999	4080	8160
3.5 Feet	1	D.2	13	06/11/1999	3210	6420
3.5 Feet	1	D.2	13.5	06/11/1999	3540	7080
3.5 Feet	1	D.2	14	06/11/1999	2730	5460
3.5 Feet	1	D.2	14.5	06/10/1999	2780	5560
3.5 Feet	2	D.2	15	06/07/1999	4800	4800
3.5 Feet	2	D.2	15.5	06/07/1999	2000	4000
3.5 Feet	2	D.2	16	06/05/1999	4100	4100
3.5 Feet	2	D.2	16.5	06/05/1999	4500	4500
3.5 Feet	2	D.2	17	06/05/1999	4000	4000
3.5 Feet	2	D.2	17.5	06/05/1999	3900	3900
3.5 Feet	1	D.2	18	06/05/1999	2650	5300
3.5 Feet	1	D.2	18.5	06/05/1999	2530	5060
3.5 Feet	1	D.2	19	06/05/1999	2710	5420
3.5 Feet	1	D.2	19.5	06/05/1999	3510	7020
3.5 Feet	1	D.2	20	06/08/1999	2240	4480
3.5 Feet	1	D.2	20.5	06/08/1999	3260	6520
3.5 Feet	1	D.2	21.2	06/08/1999	EXCLUSION	ZONE
3.5 Feet	1	D.2	22	06/08/1999	2610	5220
3.5 Feet	1	D.5	2	06/17/1999	3690	7380
3.5 Feet	1	D.5	2.5	06/17/1999	2960	5920
3.5 Feet	1	D.5	3	06/17/1999	3190	6380
3.5 Feet	2	D.5	4	06/22/1999	4400	4400
3.5 Feet	2	D.5	4.5	06/21/1999	3500	3500
3.5 Feet	2	D.5	5	06/21/1999	5000	5000
3.5 Feet	1	D.5	5.5	06/16/1999	2340	4680
3.5 Feet	1	D.5	6	06/16/1999	4310	8620
3.5 Feet	1	D.5	6.5	06/16/1999	2700	5400
3.5 Feet	1	D.5	7	06/16/1999	2670	5340
3.5 Feet	2	D.5	7.5	06/14/1999	4000	4000
3.5 Feet	2	D.5	8.2	06/14/1999	5000	5000
3.5 Feet	2	D.5	9	06/14/1999	5000	5000
3.5 Feet	2	D.5	9.5	06/14/1999	6000	6000
3.5 Feet	2	D.5	10	06/14/1999	6000	6000
3.5 Feet	2	D.5	10.5	06/14/1999	11000	11000
3.5 Feet	1	D.5	11	06/14/1999	4020	8040

x 2
2490 4980

Prepared By:

Table 4.1.1.3

Second Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
3.5 Feet	1	D.5	13.5	06/11/1999	5350	10700
3.5 Feet	1	D.5	14	06/11/1999	4840	9680
3.5 Feet	1	D.5	14.5	06/11/1999	3840	7680
3.5 Feet	2	D.5	15	06/07/1999	2000	2000
3.5 Feet	1	D.5	15.5	06/07/1999	2490	4950
3.5 Feet	2	D.5	16	06/05/1999	3800	3800
3.5 Feet	2	D.5	16.5	06/05/1999	4900	4900
3.5 Feet	2	D.5	17	06/05/1999	5000	5000
3.5 Feet	2	D.5	17.5	06/05/1999	4500	4500
3.5 Feet	1	D.5	18	06/05/1999	2120	4240
3.5 Feet	1	D.5	18.5	06/05/1999	1670	3340
3.5 Feet	1	D.5	19	06/05/1999	3400	6800
3.5 Feet	1	D.5	19.5	06/05/1999	4270	8540
3.5 Feet	1	D.5	20	06/08/1999	2250	4500
3.5 Feet	1	D.5	20.5	06/08/1999	1840	3680
3.5 Feet	1	D.5	21.2	06/08/1999	5390	10780
3.5 Feet	1	D.5	22	06/08/1999	1470	2940
3.5 Feet	1	D.8	2	06/17/1999	2800	5600
3.5 Feet	1	D.8	2.5	06/17/1999	3590	7180
3.5 Feet	1	D.8	3	06/17/1999	3180	6360
3.5 Feet	1	D.8	4	06/24/1999	2520	5040
3.5 Feet	2	D.8	4.5	06/22/1999	5200	5200
3.5 Feet	2	D.8	5	06/22/1999	5600	5600
3.5 Feet	1	D.8	5.5	06/17/1999	2970	5940
3.5 Feet	1	D.8	6	06/17/1999	3910	7820
3.5 Feet	1	D.8	6.5	06/16/1999	3810	7620
3.5 Feet	1	D.8	7	06/16/1999	2200	4400
3.5 Feet	2	D.8	7.5	06/14/1999	5000	5000
3.5 Feet	2	D.8	8.2	06/14/1999	6000	6000
3.5 Feet	2	D.8	9	06/14/1999	5000	5000
3.5 Feet	2	D.8	9.5	06/14/1999	5000	5000
3.5 Feet	2	D.8	10	06/14/1999	6000	6000
3.5 Feet	2	D.8	10.5	06/14/1999	8000	8000
3.5 Feet	1	D.8	11	06/14/1999	3260	6520
3.5 Feet	1	D.8	14.5	06/11/1999	2730	5460
3.5 Feet	2	D.8	15	06/07/1999	4600	4600
3.5 Feet	2	D.8	15.5	06/03/1999	5600	5600
3.5 Feet	2	D.8	16	06/03/1999	5200	5200
3.5 Feet	2	D.8	16.5	06/03/1999	6400	6400
3.5 Feet	2	D.8	17	06/03/1999	4800	4800
3.5 Feet	2	D.8	17.5	06/03/1999	6400	6400
3.5 Feet	2	D.8	18	06/03/1999	5200	5200
3.5 Feet	2	D.8	18.5	06/03/1999	6400	6400
3.5 Feet	2	D.8	19	06/03/1999	7600	7600
3.5 Feet	2	D.8	19.5	06/03/1999	8400	8400
3.5 Feet	1	D.8	20	06/08/1999	4280	8560
3.5 Feet	1	D.8	20.5	06/08/1999	2820	5640
3.5 Feet	1	D.8	21.2	06/08/1999	1440	2880
3.5 Feet	1	D.8	22	06/08/1999	1520	3040

2170 x 2
4340
1820 3640

Prepared By:

Eric S. Pittman

01/11/2000

Table 4.1.1.3

Second Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
3.5 Feet	1	E	1	06/25/1999	2280	4560
3.5 Feet	1	E	1.5	06/25/1999	2390	4780
3.5 Feet	1	E	2	06/25/1999	2640	5280
3.5 Feet	1	E	2.5	06/25/1999	2310	4620
3.5 Feet	1	E	3	06/23/1999	3060	6120
3.5 Feet	1	E	3.5	06/25/1999	2290	4580
3.5 Feet	1	E	4	06/24/1999	4700	9400
3.5 Feet	1	E	4.5	06/24/1999	4850	9700
3.5 Feet	1	E	5	06/24/1999	3380	6760
3.5 Feet	2	E	5.5	06/21/1999	8500	8500
3.5 Feet	2	E	6	06/21/1999	6000	6000
3.5 Feet	1	E	6.5	06/16/1999	4490	8980
3.5 Feet	1	E	6.5	06/25/1999	3070	6140
3.5 Feet	1	E	7	06/16/1999	3230	6460
3.5 Feet	1	E	7	06/25/1999	3480	6960
3.5 Feet	2	E	7.5	06/14/1999	6000	6000
3.5 Feet	2	E	8.2	06/14/1999	5000	5000
3.5 Feet	2	E	9	06/14/1999	4000	4000
3.5 Feet	2	E	9.5	06/14/1999	6000	6000
3.5 Feet	2	E	10	06/14/1999	5000	5000
3.5 Feet	2	E	10.5	06/14/1999	6000	6000
3.5 Feet	1	E	11	06/14/1999	3640	7280
3.5 Feet	2	E	13	06/09/1999	5500	5500
3.5 Feet	2	E	13.5	06/09/1999	5500	5500
3.5 Feet	2	E	14	06/09/1999	5000	5000
3.5 Feet	2	E	16.5	06/03/1999	4800	4800
3.5 Feet	2	E	17	06/03/1999	6000	6000
3.5 Feet	2	E	17.5	06/03/1999	6000	6000
3.5 Feet	2	E	18	06/03/1999	6000	6000
3.5 Feet	2	E	18.5	06/03/1999	5600	5600
3.5 Feet	2	E	19	06/03/1999	6400	6400
3.5 Feet	2	E	19.5	06/03/1999	5600	5600
3.5 Feet	1	E	20	06/08/1999	2540	5080
3.5 Feet	1	E	20.5	06/08/1999	2370	4740
3.5 Feet	1	E	21.2	06/08/1999	EXCLUSION	ZONE
3.5 Feet	1	E	22	06/08/1999	EXCLUSION	ZONE

Prepared By:

4.1.1.4 Third Cut

The third cut of the site-wide excavation was to an approximate depth of 5 feet below original site grade. The following table presents the maximum values measured in the cells during the 5 meter grid survey. As with overlying screening data, instruments consisted of Eberline ESP-1 and Ludlum 193 instruments, denoted "1" and "2" respectively on the table. Eberline counts at 30 seconds were multiplied by 2 to obtain CPM values. The threshold CPM values indicative of potential contamination were the same as for the overlying materials and are given in Section 4.1.1.1, Sub-Asphalt.

Table 4.1.1.4

Third Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
5 Foot	2	A	14	10/07/1999	3600	3600
5 Foot	2	A	14.5	10/07/1999	5600	5600
5 Foot	2	A	15	10/07/1999	5000	5000
5 Foot	2	A	17	10/19/1999	3000	3000
5 Foot	2	A	17.5	10/19/1999	5000	5000
5 Foot	2	A	18	10/19/1999	3000	3000
5 Foot	2	A	18.5	10/19/1999	3000	3000
5 Foot	2	A	19	08/16/1999	5600	5600
5 Foot	2	A	19.5	08/13/1999	4800	4800
5 Foot	2	A	20	08/13/1999	4400	4400
5 Foot	2	A	20.5	08/13/1999	4800	4800
5 Foot	2	A	21.2	10/19/1999	3500	3500
5 Foot	1	A.2	2.5	09/21/1999	2840	5680
5 Foot	1	A.2	3.5	09/21/1999	2640	5280
5 Foot	2	A.2	14.5	10/07/1999	4000	4000
5 Foot	2	A.2	15	10/07/1999	4000	4000
5 Foot	2	A.2	15.5	10/07/1999	4000	4000
5 Foot	2	A.2	16	10/07/1999	3000	3000
5 Foot	2	A.2	16.5	10/07/1999	4500	4500
5 Foot	2	A.2	17	10/07/1999	5000	5000
5 Foot	2	A.2	18	10/07/1999	3000	3000
5 Foot	2	A.2	18.5	08/16/1999	6000	6000
5 Foot	2	A.2	19	08/16/1999	4400	4400
5 Foot	2	A.2	19.5	08/13/1999	5000	5000
5 Foot	2	A.2	20	08/13/1999	4800	4800
5 Foot	2	A.2	20.5	08/13/1999	5000	5000
5 Foot	2	A.2	22	10/19/1999	4000	4000
5 Foot	2	A.5	1	10/12/1999	3000	3000
5 Foot	1	A.5	2	09/21/1999	3030	6060
5 Foot	1	A.5	2.5	09/21/1999	2380	4760
5 Foot	1	A.5	3	09/21/1999	3110	6220
5 Foot	1	A.5	3.5	09/21/1999	3670	7340
5 Foot	1	A.5	4	09/21/1999	3040	6080
5 Foot	2	A.5	14.5	10/07/1999	2400	2400
5 Foot	2	A.5	15	10/07/1999	3600	3600
5 Foot	2	A.5	15.5	10/07/1999	3000	3000
5 Foot	2	A.5	16	10/22/1999	3500	3500
5 Foot	2	A.5	16.5	10/22/1999	4800	4800
5 Foot	2	A.5	17	10/22/1999	4000	4000
5 Foot	2	A.5	17.5	10/22/1999	4800	4800
5 Foot	2	A.5	18	10/22/1999	4000	4000
5 Foot	2	A.5	18.5	10/22/1999	6000	6000
5 Foot	2	A.5	19	08/16/1999	6000	6000
5 Foot	2	A.5	19.5	08/16/1999	4000	4000
5 Foot	2	A.5	20	08/13/1999	6000	6000
5 Foot	2	A.5	20.5	08/13/1999	4800	4800
5 Foot	2	A.5	21.2	08/13/1999	4800	4800
5 Foot	2	A.5	22	08/13/1999	6400	6400
5 Foot	2	A.6	16	10/22/1999	4000	4000

Prepared By:

Table 4.1.1.4

Third Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
5 Foot	2	A.6	16.5	10/22/1999	4200	4200
5 Foot	2	A.6	17	10/22/1999	3500	3500
5 Foot	2	A.6	17.5	10/22/1999	4500	4500
5 Foot	2	A.6	18	10/22/1999	4000	4000
5 Foot	2	A.6	18.5	10/22/1999	7000	7000
5 Foot	1	A.7	2	09/21/1999	2790	5580
5 Foot	1	A.7	2.5	09/21/1999	3020	6040
5 Foot	1	A.7	3	09/21/1999	2950	5900
5 Foot	1	A.7	3.5	09/21/1999	2700	5400
5 Foot	1	A.7	4	09/21/1999	2050	4100
5 Foot	2	A.7	14.5	10/07/1999	4000	4000
5 Foot	2	A.7	15	10/07/1999	3000	3000
5 Foot	2	A.7	15.5	10/12/1999	3500	3500
5 Foot	2	A.7	16	10/07/1999	3000	3000
5 Foot	2	A.7	16.5	10/07/1999	4000	4000
5 Foot	2	A.7	17	10/12/1999	3000	3000
5 Foot	2	A.7	17.5	10/07/1999	3000	3000
5 Foot	2	A.7	18	08/16/1999	6400	6400
5 Foot	2	A.7	18.5	08/16/1999	6400	6400
5 Foot	2	A.7	19	08/16/1999	4000	4000
5 Foot	2	A.7	19.5	08/16/1999	4400	4400
5 Foot	2	A.7	20	08/13/1999	5200	5200
5 Foot	2	A.7	20.5	08/13/1999	5000	5000
5 Foot	2	A.7	21.2	08/13/1999	4400	4400
5 Foot	2	A.7	22	08/13/1999	7000	7000
5 Foot	2	B	14.5	10/07/1999	3000	3000
5 Foot	2	B	15	10/07/1999	4000	4000
5 Foot	2	B	15.5	10/07/1999	3500	3500
5 Foot	2	B	16	10/07/1999	5000	5000
5 Foot	2	B	16.5	10/07/1999	5000	5000
5 Foot	2	B	17	10/07/1999	4000	4000
5 Foot	2	B	17.5	10/07/1999	4000	4000
5 Foot	2	B	18.5	08/16/1999	6000	6000
5 Foot	2	B	19	08/16/1999	4400	4400
5 Foot	2	B	19.5	08/16/1999	4400	4400
5 Foot	2	B	20	08/13/1999	5200	5200
5 Foot	2	B	20.5	08/13/1999	5000	5000
5 Foot	2	B	22	08/13/1999	4800	4800
5 Foot	1	B.2	2.5	09/21/1999	2850	5700
5 Foot	1	B.2	3	09/21/1999	3390	6780
5 Foot	1	B.2	3.5	09/21/1999	3100	6200
5 Foot	1	B.2	4	09/21/1999	2600	5200
5 Foot	2	B.2	14.5	10/07/1999	3000	3000
5 Foot	2	B.2	15	10/07/1999	2500	2500
5 Foot	2	B.2	15.5	10/07/1999	3000	3000
5 Foot	2	B.2	16	10/07/1999	3000	3000
5 Foot	2	B.2	16.5	10/07/1999	6000	6000
5 Foot	2	B.2	17	10/07/1999	4000	4000
5 Foot	2	B.2	17.5	10/07/1999	4000	4000

Prepared By:

Table 4.1.1.4

Third Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
5 Foot	2	B.2	19.5	08/13/1999	5200	5200
5 Foot	2	B.2	20	08/13/1999	4800	4800
5 Foot	2	B.2	20.5	08/13/1999	4800	4800
5 Foot	2	B.2	21.2	08/13/1999	5000	5000
5 Foot	2	B.2	22	08/13/1999	5200	5200
5 Foot	2	B.4	1	09/17/1999	6800	6800
5 Foot	2	B.4	1.5	09/17/1999	5000	5000
5 Foot	2	B.4	2	09/17/1999	4500	4500
5 Foot	2	B.4	2.5	09/17/1999	5500	5500
5 Foot	2	B.4	3	09/17/1999	7000	7000
5 Foot	2	B.4	3.5	09/17/1999	5200	5200
5 Foot	2	B.4	4	09/17/1999	4500	4500
5 Foot	2	B.4	12.5	08/13/1999	4800	4800
5 Foot	2	B.4	13.5	10/06/1999	4000	4000
5 Foot	2	B.4	14	10/06/1999	4000	4000
5 Foot	2	B.4	14.5	10/07/1999	4000	4000
5 Foot	2	B.4	15	10/07/1999	3000	3000
5 Foot	2	B.4	15.5	10/07/1999	4000	4000
5 Foot	2	B.4	16	10/07/1999	3000	3000
5 Foot	2	B.4	16.5	10/07/1999	3500	3500
5 Foot	2	B.4	17	10/07/1999	5000	5000
5 Foot	2	B.4	20	08/13/1999	4800	4800
5 Foot	2	B.4	20.5	08/13/1999	4400	4400
5 Foot	2	B.4	21.2	08/13/1999	4800	4800
5 Foot	2	B.4	22	08/13/1999	5000	5000
5 Foot	2	B.8	1	09/17/1999	5200	5200
5 Foot	2	B.8	1.5	09/17/1999	5500	5500
5 Foot	2	B.8	2	09/17/1999	5000	5000
5 Foot	2	B.8	2.5	09/17/1999	5000	5000
5 Foot	2	B.8	3	09/17/1999	4500	4500
5 Foot	2	B.8	3.5	09/17/1999	4500	4500
5 Foot	2	B.8	4	09/17/1999	4000	4000
5 Foot	2	B.8	13	10/06/1999	4500	4500
5 Foot	2	B.8	13.5	10/06/1999	3000	3000
5 Foot	2	B.8	14	10/06/1999	5000	5000
5 Foot	2	B.8	14.5	10/07/1999	4000	4000
5 Foot	2	B.8	15	10/07/1999	3500	3500
5 Foot	2	B.8	15.5	10/07/1999	3000	3000
5 Foot	2	B.8	16	10/07/1999	5000	5000
5 Foot	2	B.8	16.5	10/07/1999	4000	4000
5 Foot	2	B.8	17	10/07/1999	7500	7500
5 Foot	2	B.8	20.5	08/13/1999	4800	4800
5 Foot	2	B.8	21.2	08/13/1999	4800	4800
5 Foot	2	B.8	22	08/13/1999	4500	4500
5 Foot	2	C	10	10/12/1999	3000	3000
5 Foot	2	C	10.5	10/06/1999	3000	3000
5 Foot	2	C	11	10/06/1999	3500	3500
5 Foot	2	C	11.5	10/06/1999	3000	3000
5 Foot	2	C	12	10/05/1999	4000	4000

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Table 4.1.1.4

Third Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
5 Foot	2	C	12.5	10/06/1999	4000	4000
5 Foot	2	C	13	10/05/1999	4000	4000
5 Foot	2	C	13.5	10/06/1999	5500	5500
5 Foot	2	C	14	10/04/1999	3500	3500
5 Foot	2	C	14.5	10/07/1999	2500	2500
5 Foot	2	C	15	10/07/1999	4500	4500
5 Foot	2	C	15.5	10/07/1999	3000	3000
5 Foot	2	C	16	10/05/1999	4500	4500
5 Foot	2	C	16.5	10/07/1999	5000	5000
5 Foot	2	C	17	10/05/1999	5000	5000
5 Foot	2	C	17.5	10/12/1999	4000	4000
5 Foot	2	C	20.5	10/12/1999	6000	6000
5 Foot	2	C	21.2	10/02/1999	4000	4000
5 Foot	2	C	22	08/13/1999	4900	4900
5 Foot	1	C.2	5.5	09/20/1999	2950	5900
5 Foot	2	C.2	6	09/20/1999	2900	2900
5 Foot	2	C.2	6.5	09/20/1999	3000	3000
5 Foot	2	C.2	7	09/20/1999	2800	2800
5 Foot	2	C.2	7.5	09/20/1999	3000	3000
5 Foot	2	C.2	8	09/20/1999	2800	2800
5 Foot	2	C.2	8.5	09/20/1999	2600	2600
5 Foot	2	C.2	9	09/20/1999	2800	2800
5 Foot	2	C.2	9.5	10/06/1999	3500	3500
5 Foot	2	C.2	10	10/06/1999	4000	4000
5 Foot	2	C.2	10.5	10/06/1999	4000	4000
5 Foot	2	C.2	11	10/06/1999	3000	3000
5 Foot	2	C.2	11.5	10/05/1999	3200	3200
5 Foot	2	C.2	12	10/05/1999	4500	4500
5 Foot	2	C.2	12.5	10/05/1999	5000	5000
5 Foot	2	C.2	13	10/05/1999	5000	5000
5 Foot	2	C.2	13.5	10/04/1999	5000	5000
5 Foot	2	C.2	14	10/04/1999	6000	6000
5 Foot	2	C.2	14.5	10/04/1999	4000	4000
5 Foot	2	C.2	15	10/04/1999	4000	4000
5 Foot	2	C.2	15.5	10/05/1999	3500	3500
5 Foot	2	C.2	16	10/05/1999	2500	2500
5 Foot	2	C.2	16.5	10/05/1999	4500	4500
5 Foot	2	C.2	17	10/05/1999	5000	5000
5 Foot	2	C.2	17.5	10/12/1999	4000	4000
5 Foot	2	C.2	20.5	10/02/1999	5000	5000
5 Foot	2	C.2	21.2	10/02/1999	4000	4000
5 Foot	2	C.2	22	10/19/1999	4500	4500
5 Foot	1	C.6	5.5	09/20/1999	2680	5360
5 Foot	2	C.6	6	09/20/1999	2800	2800
5 Foot	2	C.6	6.5	09/20/1999	2400	2400
5 Foot	2	C.6	7	09/20/1999	2600	2600
5 Foot	2	C.6	7.5	09/20/1999	2600	2600
5 Foot	2	C.6	8.2	09/20/1999	2400	2400
5 Foot	2	C.6	8.5	09/20/1999	2200	2200

Prepared By:

Table 4.1.1.4

Third Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
5 Foot	2	C.6	9	09/20/1999	2400	2400
5 Foot	2	C.6	9.5	10/06/1999	2000	2000
5 Foot	2	C.6	10	10/06/1999	3000	3000
5 Foot	2	C.6	10.5	10/06/1999	4000	4000
5 Foot	2	C.6	11	10/06/1999	3500	3500
5 Foot	2	C.6	11.5	10/05/1999	4200	4200
5 Foot	2	C.6	12	10/05/1999	5000	5000
5 Foot	2	C.6	12.5	10/05/1999	5500	5500
5 Foot	2	C.6	13	10/05/1999	6000	6000
5 Foot	2	C.6	13.5	10/04/1999	6500	6500
5 Foot	2	C.6	14	10/04/1999	5000	5000
5 Foot	2	C.6	14.5	10/04/1999	4000	4000
5 Foot	2	C.6	15	10/04/1999	4500	4500
5 Foot	2	C.6	15.5	10/05/1999	3000	3000
5 Foot	2	C.6	16	10/05/1999	3200	3200
5 Foot	2	C.6	16.5	10/05/1999	3000	3000
5 Foot	2	C.6	17	10/05/1999	4500	4500
5 Foot	2	C.6	17.5	10/02/1999	4000	4000
5 Foot	2	C.6	20	10/02/1999	4200	4200
5 Foot	2	C.6	20.5	10/02/1999	4000	4000
5 Foot	2	C.6	21.2	10/02/1999	4000	4000
5 Foot	2	C.6	22	10/19/1999	4500	4500
5 Foot	1	C.8	5.5	09/20/1999	2950	5900
5 Foot	2	C.8	6	09/20/1999	3300	3300
5 Foot	2	C.8	6.5	09/20/1999	3000	3000
5 Foot	1	C.8	7	09/20/1999	3800	7600
5 Foot	2	C.8	7.5	09/20/1999	2400	2400
5 Foot	2	C.8	8.2	09/20/1999	2200	2200
5 Foot	2	C.8	9	09/20/1999	2800	2800
5 Foot	2	C.8	9.5	10/06/1999	5000	5000
5 Foot	2	C.8	10	10/06/1999	3000	3000
5 Foot	2	C.8	10.5	10/06/1999	6000	6000
5 Foot	2	C.8	11	10/12/1999	3500	3500
5 Foot	2	C.8	11.5	10/05/1999	4000	4000
5 Foot	2	C.8	12	10/05/1999	5000	5000
5 Foot	2	C.8	12.5	10/05/1999	5000	5000
5 Foot	2	C.8	13	10/05/1999	5500	5500
5 Foot	2	C.8	13.5	10/04/1999	7000	7000
5 Foot	2	C.8	14	10/04/1999	4000	4000
5 Foot	2	C.8	14.5	10/04/1999	4500	4500
5 Foot	2	C.8	15	10/04/1999	3500	3500
5 Foot	2	C.8	15.5	10/05/1999	4000	4000
5 Foot	2	C.8	16	10/05/1999	4000	4000
5 Foot	2	C.8	16.5	10/05/1999	3500	3500
5 Foot	2	C.8	17	10/05/1999	4000	4000
5 Foot	2	C.8	17.5	10/02/1999	5000	5000
5 Foot	2	C.8	20	10/02/1999	4500	4500
5 Foot	2	C.8	20.5	10/02/1999	4000	4000
5 Foot	2	C.8	21.2	10/02/1999	4000	4000

Prepared By:

Table 4.1.1.4

Third Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
5 Foot	2	C.8	22	10/19/1999	3500	3500
5 Foot	1	Coffer	Dam	06/28/1999	<Alarm	<Alarm
5 Foot	1	D	5.5	09/20/1999	2800	5600
5 Foot	2	D	6	09/20/1999	4750	4750
5 Foot	2	D	6.5	09/20/1999	4500	4500
5 Foot	2	D	7	09/20/1999	5000	5000
5 Foot	2	D	7.5	10/01/1999	3900	3900
5 Foot	2	D	8	10/01/1999	4000	4000
5 Foot	2	D	8.5	10/01/1999	4500	4500
5 Foot	2	D	9	10/01/1999	4500	4500
5 Foot	2	D	9.5	10/02/1999	3800	3800
5 Foot	2	D	10	10/02/1999	3000	3000
5 Foot	2	D	10.5	10/02/1999	8000	8000
5 Foot	2	D	11	10/02/1999	4000	4000
5 Foot	2	D	11.5	10/02/1999	7000	7000
5 Foot	2	D	12	10/12/1999	3500	3500
5 Foot	2	D	12.5	10/05/1999	7000	7000
5 Foot	2	D	13	10/02/1999	6500	6500
5 Foot	2	D	13.5	10/04/1999	5200	5200
5 Foot	2	D	14	10/04/1999	5100	5100
5 Foot	2	D	14.5	10/04/1999	3500	3500
5 Foot	2	D	15	10/04/1999	4200	4200
5 Foot	2	D	15.5	10/04/1999	4000	4000
5 Foot	2	D	16	10/04/1999	4000	4000
5 Foot	2	D	16.5	10/04/1999	2600	2600
5 Foot	2	D	17	10/04/1999	4000	4000
5 Foot	2	D	17.5	10/04/1999	6200	6200
5 Foot	2	D	18	10/04/1999	3200	3200
5 Foot	2	D	18.5	10/04/1999	2400	2400
5 Foot	2	D	19	10/04/1999	3800	3800
5 Foot	2	D	20	10/02/1999	7000	7000
5 Foot	2	D	20.5	10/02/1999	2000	2000
5 Foot	2	D	21.2	10/02/1999	4000	4000
5 Foot	2	D	22	10/19/1999	4000	4000
5 Foot	2	D.2	5.5	09/20/1999	3040	6080
5 Foot	2	D.2	6	09/20/1999	2880	5760
5 Foot	1	D.2	6.5	09/20/1999	3230	6460
5 Foot	2	D.2	7	09/20/1999	4000	4000
5 Foot	2	D.2	7.5	10/01/1999	3600	3600
5 Foot	2	D.2	8	10/01/1999	4200	4200
5 Foot	2	D.2	9	10/01/1999	4200	4200
5 Foot	2	D.2	9.5	10/02/1999	3900	3900
5 Foot	2	D.2	10	10/02/1999	4100	4100
5 Foot	2	D.2	10.5	10/02/1999	4000	4000
5 Foot	2	D.2	11	10/02/1999	3000	3000
5 Foot	2	D.2	11.5	10/02/1999	6000	6000
5 Foot	2	D.2	12	10/02/1999	4000	4000
5 Foot	2	D.2	12.5	10/02/1999	5500	5500
5 Foot	2	D.2	13	10/02/1999	6300	6300

3040 3040 7
2880 2880

Prepared By:

Table 4.1.1.4

Third Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
5 Foot	2	D.2	13.5	10/04/1999	5800	5800
5 Foot	2	D.2	14	10/04/1999	6250	6250
5 Foot	2	D.2	14.5	10/04/1999	3800	3800
5 Foot	2	D.2	15	10/04/1999	3800	3800
5 Foot	2	D.2	15.5	10/04/1999	3000	3000
5 Foot	2	D.2	16	10/04/1999	3800	3800
5 Foot	2	D.2	16.5	10/04/1999	2600	2600
5 Foot	2	D.2	17	10/04/1999	7000	7000
5 Foot	2	D.2	17.5	10/04/1999	3600	3600
5 Foot	2	D.2	18	10/04/1999	1800	1800
5 Foot	2	D.2	18.5	10/04/1999	2400	2400
5 Foot	2	D.2	19	10/04/1999	4000	4000
5 Foot	2	D.2	19.5	10/02/1999	6000	6000
5 Foot	2	D.2	20	10/02/1999	6000	6000
5 Foot	2	D.2	20.5	10/02/1999	5000	5000
5 Foot	2	D.2	21.2	10/02/1999	3000	3000
5 Foot	2	D.2	22	10/19/1999	4000	4000
5 Foot	2	D.5	5.5	09/20/1999	2990	5980
5 Foot	1	D.5	6	09/20/1999	3120	6240
5 Foot	1	D.5	6.5	09/20/1999	3680	7360
5 Foot	2	D.5	7	09/20/1999	4500	4500
5 Foot	2	D.5	7.5	10/01/1999	4000	4000
5 Foot	2	D.5	8.2	10/01/1999	4000	4000
5 Foot	2	D.5	9	10/01/1999	3000	3000
5 Foot	2	D.5	9.5	10/02/1999	4400	4400
5 Foot	2	D.5	10	10/02/1999	4000	4000
5 Foot	2	D.5	10.5	10/02/1999	4200	4200
5 Foot	2	D.5	11	10/02/1999	5000	5000
5 Foot	2	D.5	11.5	10/02/1999	3900	3900
5 Foot	2	D.5	12	10/02/1999	4000	4000
5 Foot	2	D.5	12.5	10/02/1999	5000	5000
5 Foot	2	D.5	13	10/02/1999	6800	6800
5 Foot	2	D.5	13.5	10/04/1999	5000	5000
5 Foot	2	D.5	14	10/04/1999	4800	4800
5 Foot	2	D.5	14.5	10/04/1999	3000	3000
5 Foot	2	D.5	15	10/04/1999	3200	3200
5 Foot	2	D.5	15.5	10/04/1999	4000	4000
5 Foot	2	D.5	16	10/04/1999	3800	3800
5 Foot	2	D.5	16.5	10/04/1999	3000	3000
5 Foot	2	D.5	17	10/04/1999	5200	5200
5 Foot	2	D.5	17.5	10/04/1999	3600	3600
5 Foot	2	D.5	18	10/04/1999	1600	1600
5 Foot	2	D.5	18.5	10/04/1999	3800	3800
5 Foot	2	D.5	19	10/04/1999	1800	1800
5 Foot	2	D.5	19.5	10/02/1999	6000	6000
5 Foot	2	D.5	20	10/02/1999	6000	6000
5 Foot	2	D.5	20.5	10/02/1999	7000	7000
5 Foot	2	D.5	21.2	10/02/1999	8000	8000
5 Foot	2	D.5	22	10/19/1999	3500	3500

2990

2990 ~ 2990 Not 5980

Prepared By:

Eric S. Pittman

01/10/2000

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Table 4.1.1.4

Third Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
5 Foot	1	D.8	5.5	09/20/1999	3050	6100
5 Foot	2	D.8	6	09/20/1999	4500	4500
5 Foot	1	D.8	6.5	09/20/1999	2880	5760
5 Foot	2	D.8	7	09/20/1999	5000	5000
5 Foot	2	D.8	7.5	10/01/1999	4100	4100
5 Foot	2	D.8	8.2	10/01/1999	4300	4300
5 Foot	2	D.8	9	10/01/1999	4200	4200
5 Foot	2	D.8	9.5	10/02/1999	4000	4000
5 Foot	2	D.8	10	10/02/1999	4000	4000
5 Foot	2	D.8	10.5	10/02/1999	3500	3500
5 Foot	2	D.8	11	10/02/1999	6000	6000
5 Foot	2	D.8	11.5	10/02/1999	3900	3900
5 Foot	2	D.8	12	10/02/1999	6000	6000
5 Foot	2	D.8	12.5	10/02/1999	4500	4500
5 Foot	2	D.8	13	10/02/1999	5000	5000
5 Foot	2	D.8	13.5	10/04/1999	6500	6500
5 Foot	2	D.8	14	10/04/1999	4800	4800
5 Foot	2	D.8	14.5	10/04/1999	3500	3500
5 Foot	2	D.8	15	10/04/1999	4800	4800
5 Foot	2	D.8	15.5	10/04/1999	3000	3000
5 Foot	2	D.8	16	10/04/1999	4000	4000
5 Foot	2	D.8	16.5	10/04/1999	3000	3000
5 Foot	2	D.8	17	10/04/1999	4800	4800
5 Foot	2	D.8	17.5	10/04/1999	4200	4200
5 Foot	2	D.8	18	10/04/1999	2400	2400
5 Foot	2	D.8	18.5	10/04/1999	3000	3000
5 Foot	2	D.8	19	10/04/1999	2900	2900
5 Foot	2	D.8	19.5	10/02/1999	4000	4000
5 Foot	2	D.8	20	10/02/1999	3500	3500
5 Foot	2	D.8	20.5	10/12/1999	5000	5000
5 Foot	2	D.8	21.2	10/02/1999	4500	4500
5 Foot	2	D.8	22	10/19/1999	4000	4000
5 Foot	1	E	5.5	09/20/1999	2680	5360
5 Foot	1	E	6	09/20/1999	2720	5440
5 Foot	1	E	6.5	09/20/1999	4030	8060
5 Foot	1	E	7	09/20/1999	3100	6200
5 Foot	2	E	7.5	10/01/1999	3800	3800
5 Foot	2	E	8.2	10/01/1999	4800	4800
5 Foot	2	E	9	10/01/1999	5300	5300
5 Foot	2	E	9.5	10/02/1999	5500	5500
5 Foot	2	E	10	10/12/1999	4000	4000
5 Foot	2	E	10.5	10/02/1999	3900	3900
5 Foot	2	E	11	10/12/1999	4000	4000
5 Foot	2	E	11.5	10/02/1999	4100	4100
5 Foot	2	E	12	10/02/1999	3500	3500
5 Foot	2	E	12.5	10/02/1999	5000	5000
5 Foot	2	E	13	10/02/1999	4000	4000
5 Foot	2	E	13.5	10/04/1999	5200	5200
5 Foot	2	E	14	10/04/1999	5000	5000

Prepared By:

Table 4.1.1.4

Third Cut

Cut Layer Depth	Instrument Code	East-West Grid	North-South Grid	Date Surveyed	Raw Counts	CPM
5 Foot	2	E	14.5	10/12/1999	5000	5000
5 Foot	2	E	15	10/04/1999	5800	5800
5 Foot	2	E	15.5	10/04/1999	3600	3600
5 Foot	2	E	16	10/04/1999	3600	3600
5 Foot	2	E	16.5	10/04/1999	3000	3000
5 Foot	2	E	17	10/04/1999	5000	5000
5 Foot	2	E	17.5	10/04/1999	3600	3600
5 Foot	2	E	18	10/04/1999	3600	3600
5 Foot	2	E	18.5	10/04/1999	5500	5500
5 Foot	2	E	19	10/04/1999	3900	3900
5 Foot	2	E	19.5	10/02/1999	7000	7000
5 Foot	2	E	20	10/12/1999	3000	3000
5 Foot	2	E	20.5	10/12/1999	3500	3500
5 Foot	2	E	21.2	10/02/1999	4000	4000

Prepared By:

4.1.2 Potholes/Test Pits for Caisson Installation

Potholes/test pits were excavated at each caisson location to explore for and remove obstructions. The excavated spoil was screened using either a Ludlum 193 or Eberline ESP-1, designated "2" or "1", respectively, on the following table. The caisson designation references the column lines and rows as shown on Figure 1.2.

Contamination screening consisted of documenting whether radiation reading of the excavated soil exceeded the alarm level for the instrument. The alarm level was set at 80 percent of the value indicative of activity equal to or exceeding the 7.1 pCi/g clean-up objective threshold. The following table notes whether an alarm exceedance was detected in the specific test pit material.

Outside of Lake Lindsay, one area was identified based on test pit screening, Area 13 on Figure 1.2.

The northwest corner of the site was underlain by a dense concentration of wood piles. These piles precluded test pit potholing for obstructions. After the pilings were removed, the ground surface was screened but the area was not potholed.

Five test pit records are not included (C-15, RA-R1, RA-R3, RB-R2, and RC-R1). These locations were screened as the underground storage tanks were removed from these areas and were not explored in test pits.

Table 4.1.2

Caisson Potholing Survey Results

Date	Caisson I.D.	Instrument Code	Reading
6/19/99	A.1-8	1	Less Than Alarm Setpoint
7/1/99	A.2-7	2	Less Than Alarm Setpoint
6/30/99	A.3-1	2	Less Than Alarm Setpoint
6/30/99	A.3-2	2	Less Than Alarm Setpoint
6/30/99	A.3-3	2	Less Than Alarm Setpoint
7/1/99	A.3-4	2	Less Than Alarm Setpoint
7/1/99	A.3-5	2	20KCPM
7/1/99	A.3-6	2	Less Than Alarm Setpoint
7/6/99	A.8-1	2	Less Than Alarm Setpoint
6/30/99	A1	2	Less Than Alarm Setpoint
6/30/99	A2	2	Less Than Alarm Setpoint
6/30/99	A3	2	Less Than Alarm Setpoint
7/1/99	A4	2	Less Than Alarm Setpoint
7/1/99	A5	2	Less Than Alarm Setpoint
7/1/99	A6	2	Less Than Alarm Setpoint
7/1/99	A7	2	15KCPM
6/19/99	A8	1	Less Than Alarm Setpoint
6/19/99	A9	1	Less Than Alarm Setpoint
6/19/99	A10	1	Less Than Alarm Setpoint
6/19/99	A11	1	Less Than Alarm Setpoint
6/19/99	A12	1	Less Than Alarm Setpoint
6/19/99	A13	1	Less Than Alarm Setpoint
6/12/99	A14	2	Less Than Alarm Setpoint
6/11/99	A15	2	Less Than Alarm Setpoint
6/11/99	A16	NR	Less Than Alarm Setpoint
6/10/99	A17	2	16KCPM
6/10/99	A18	2	Less Than Alarm Setpoint
6/10/99	A19	NR	Less Than Alarm Setpoint
6/9/99	A20	NR	Less Than Alarm Setpoint
6/9/99	A21.4	NR	Less Than Alarm Setpoint
6/9/99	A22	NR	Less Than Alarm Setpoint
6/11/99	B.6-16.5	2	Less Than Alarm Setpoint
7/6/99	B1	2	Less Than Alarm Setpoint
7/1/99	B2	2	Less Than Alarm Setpoint
7/1/99	B3	2	Less Than Alarm Setpoint
7/1/99	B4	2	Less Than Alarm Setpoint
6/28/99	B5	2	Less Than Alarm Setpoint
7/24/99	B6	2	Less Than Alarm Setpoint
6/23/99	B7	2	Less Than Alarm Setpoint
6/23/99	B8	2	Less Than Alarm Setpoint
6/15/99	B9	2	Less Than Alarm Setpoint
6/14/99	B10	2	Less Than Alarm Setpoint
6/14/99	B11	2	Less Than Alarm Setpoint
6/14/99	B12	2	Less Than Alarm Setpoint

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Table 4.1.2

Caisson Potholing Survey Results

Date	Caisson I.D.	Instrument Code	Reading
6/21/99	B13	2	Less Than Alarm Setpoint
6/21/99	B14	2	Less Than Alarm Setpoint
6/21/99	B15	2	Less Than Alarm Setpoint
6/12/99	B16	2	Less Than Alarm Setpoint
6/12/99	B17	2	Less Than Alarm Setpoint
6/5/99	B22	NR	Less Than Alarm Setpoint
6/11/99	C.2-17	2	Less Than Alarm Setpoint
7/24/99	C.4-1	2	Less Than Alarm Setpoint
7/24/99	C2	2	Less Than Alarm Setpoint
6/28/99	C3	2	Less Than Alarm Setpoint
6/28/99	C4	2	Less Than Alarm Setpoint
6/28/99	C5	2	Less Than Alarm Setpoint
6/28/99	C6	2	Less Than Alarm Setpoint
6/23/99	C7	2	Less Than Alarm Setpoint
6/23/99	C8	2	Less Than Alarm Setpoint
6/23/99	C9	2	Less Than Alarm Setpoint
6/14/99	C10	2	Less Than Alarm Setpoint
6/14/99	C11	2	Less Than Alarm Setpoint
6/14/99	C12	2	Less Than Alarm Setpoint
6/12/99	C13	2	Less Than Alarm Setpoint
6/12/99	C14	2	Less Than Alarm Setpoint
tank	C15	NR	Less Than Alarm Setpoint
6/11/99	C17	2	Less Than Alarm Setpoint
6/5/99	C22	NR	Less Than Alarm Setpoint
6/5/99	C.6-22	NR	Less Than Alarm Setpoint
6/28/99	D.8-6	2	Less Than Alarm Setpoint
Piles	D1	NR	Less Than Alarm Setpoint
Piles	D2	NR	Less Than Alarm Setpoint
Piles	D3	NR	Less Than Alarm Setpoint
Piles	D4	NR	Less Than Alarm Setpoint
Piles	D5	NR	Less Than Alarm Setpoint
6/28/99	D6	2	Less Than Alarm Setpoint
6/25/99	D7	2	Less Than Alarm Setpoint
6/23/99	D8	2	Less Than Alarm Setpoint
6/15/99	D9	2	Less Than Alarm Setpoint
6/15/99	D10	2	Less Than Alarm Setpoint
6/15/99	D11	2	Less Than Alarm Setpoint
6/15/99	D12	2	Less Than Alarm Setpoint
6/15/99	D13	2	Less Than Alarm Setpoint
6/15/99	D14	2	Less Than Alarm Setpoint
6/15/99	D15	2	Less Than Alarm Setpoint
6/15/99	D16	2	Less Than Alarm Setpoint
6/7/99	D17	NR	Less Than Alarm Setpoint
6/7/99	D21.5	1	Less Than Alarm Setpoint

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Table 4.1.2

Caisson Potholing Survey Results

Date	Caisson I.D.	Instrument Code	Reading
6/7/99	D.1-22	NR	Less Than Alarm Setpoint
6/7/99	D.8-22	NR	Less Than Alarm Setpoint
Piles	D.6-4	NR	Less Than Alarm Setpoint
Piles	D.6-5	NR	Less Than Alarm Setpoint
Piles	D.8-1	NR	Less Than Alarm Setpoint
Piles	D.9-7	NR	Less Than Alarm Setpoint
Piles	D.9-8	NR	Less Than Alarm Setpoint
Piles	E1	NR	Less Than Alarm Setpoint
Piles	E2	NR	Less Than Alarm Setpoint
Piles	E3	NR	Less Than Alarm Setpoint
Piles	E4	NR	Less Than Alarm Setpoint
6/25/99	E5	2	Less Than Alarm Setpoint
6/25/99	E6	2	Less Than Alarm Setpoint
6/11/99	E8	2	Less Than Alarm Setpoint
6/11/99	E9	2	Less Than Alarm Setpoint
6/11/99	E10	2	Less Than Alarm Setpoint
6/11/99	E11	2	Less Than Alarm Setpoint
6/12/99	E12	2	Less Than Alarm Setpoint
6/12/99	E13	2	Less Than Alarm Setpoint
6/12/99	E14	2	Less Than Alarm Setpoint
6/11/99	E15	2	Less Than Alarm Setpoint
6/12/99	E15	2	Less Than Alarm Setpoint
6/10/99	E16	NR	Less Than Alarm Setpoint
6/10/99	E17	NR	Less Than Alarm Setpoint
6/10/99	E18	NR	Less Than Alarm Setpoint
6/10/99	E19	NR	Less Than Alarm Setpoint
6/10/99	E20	NR	Less Than Alarm Setpoint
6/10/99	E21	NR	Less Than Alarm Setpoint
6/10/99	E22	NR	Less Than Alarm Setpoint
Tower Caissons			
Tank	RA-R1	NR	Less Than Alarm Setpoint
Tank	RA-R3	NR	Less Than Alarm Setpoint
Tank	RB-R2	NR	Less Than Alarm Setpoint
Tank	RC-R1	NR	Less Than Alarm Setpoint
6/7/99	RA-R6	NR	Less Than Alarm Setpoint
6/5/99	RA-R8	NR	Less Than Alarm Setpoint
6/5/99	RB-R7	NR	Less Than Alarm Setpoint
6/5/99	RC-R8	NR	Less Than Alarm Setpoint
6/7/99	RD-R3	NR	Less Than Alarm Setpoint
6/7/99	RD-R4.5	NR	Less Than Alarm Setpoint
6/7/99	RD-R6	NR	Less Than Alarm Setpoint
6/7/99	RE-R3	NR	Less Than Alarm Setpoint

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Table 4.1.2

Caisson Potholing Survey Results

Date	Caisson I.D.	Instrument Code	Reading
6/7/99	RE-R4.5	NR	Less Than Alarm Setpoint
6/7/99	RE-R6	NR	Less Than Alarm Setpoint
6/5/99	RD-R1	NR	Less Than Alarm Setpoint
6/5/99	RF-R8	NR	Less Than Alarm Setpoint
6/5/99	RG-R2	NR	Less Than Alarm Setpoint
6/5/99	RG-R7	NR	Less Than Alarm Setpoint
6/5/99	RH-R1	NR	Less Than Alarm Setpoint
6/5/99	RH-R3	NR	Less Than Alarm Setpoint
6/5/99	RH-R6	NR	Less Than Alarm Setpoint

NR = Not Recorded

4.1.3 Guidewall Screening

A trench for construction of the slurry wall guidewall was excavated around the perimeter of the site to an approximate depth of 8 feet. The following table presents the readings taken in the trench. Coordinates reference the intervals between perimeter columns using the column lines and rows shown on Figure 1.2.

All readings were taken with the Ludlum 193 instrument. Readings over the alarm level of 5,179 represent exceedances of 80 percent of the value indicative of activity in soil at or exceeding the 7.1 pCi/g clean-up objective.

Four areas were identified as exceeding clean-up levels in the guidewall screening (5, 10, 12, and 21 on Figure 1.2). All of these areas were remediated and released with the exception of Area 10 which was included in the off-site areas covered by the Highway Authority Agreement (Attachment C).

Table 4.1.3

Guidewall Screening

Date	Coordinates	Reading
07/24/99	A,A.3-1, AND A.3-1,A.6-1	Less Than Alarm Setpoint
06/24/99	A.4-22,B22	Less Than Alarm Setpoint
07/22/99	A1,A2	Less Than Alarm Setpoint
07/16/99	A2,A3	Less Than Alarm Setpoint
07/14/99	A3,A4	Less Than Alarm Setpoint
07/15/99	A4,A5	Less Than Alarm Setpoint
07/13/99	A5,A6	Less Than Alarm Setpoint
07/08/99	A6,A7	Less Than Alarm Setpoint
07/15/99	A7,A8	Less Than Alarm Setpoint
07/13/99	A8,A9	Less Than Alarm Setpoint
07/08/99	A9,A10	Less Than Alarm Setpoint
07/14/99	A10,A11	Less Than Alarm Setpoint
07/12/99	A11,A12	Less Than Alarm Setpoint
06/21/99	A11,A13	Less Than Alarm Setpoint
06/22/99	A12,A14	Less Than Alarm Setpoint
07/07/99	A13,A14	Less Than Alarm Setpoint
07/06/99	A14,A15	Less Than Alarm Setpoint
06/21/99	A15,A17	Less Than Alarm Setpoint
06/19/99	A17,A19	Less Than Alarm Setpoint
06/21/99	A19,A20	Less Than Alarm Setpoint
06/29/99	A20,A22	Less Than Alarm Setpoint
06/29/99	A22,B22	Less Than Alarm Setpoint
07/28/99	B1,A.7-1	Less Than Alarm Setpoint
06/24/99	B22,C22	Less Than Alarm Setpoint
07/30/99	C.4-1,B1	Less Than Alarm Setpoint
06/24/99	C22,C.6-22	Less Than Alarm Setpoint
06/25/99	D.1-22,D.2-22	Less Than Alarm Setpoint
06/25/99	D.2-22,D.8-22	Less Than Alarm Setpoint
07/24/99	D.4-1,D.7-1	Less Than Alarm Setpoint
07/21/99	D.8-1,E1,E2	Less Than Alarm Setpoint
08/03/99	D1,C.4-1	Less Than Alarm Setpoint
07/28/99	D1,D.2-1	Less Than Alarm Setpoint
06/30/99	D22,C.6-22	Less Than Alarm Setpoint
07/09/99	E10,E11	Less Than Alarm Setpoint
07/02/99	E11,E12	Less Than Alarm Setpoint
06/28/99	E12,E13	Less Than Alarm Setpoint
06/28/99	E13,E15	Less Than Alarm Setpoint
07/06/99	E15,E16	Less Than Alarm Setpoint
06/30/99	E16,E17	Less Than Alarm Setpoint
07/06/99	E17,E18	Less Than Alarm Setpoint
06/30/99	E18,E19	Less Than Alarm Setpoint
06/26/99	E19,E20	Less Than Alarm Setpoint
07/19/99	E2,E3	Less Than Alarm Setpoint
06/30/99	E20,E21	Less Than Alarm Setpoint
06/26/99	E21,E22,D8	Less Than Alarm Setpoint
07/21/99	E3,E4	Less Than Alarm Setpoint
07/19/99	E4,E5	Less Than Alarm Setpoint
07/12/99	E5,E6	Less Than Alarm Setpoint

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Table 4.1.3

Guidewall Screening

Date	Coordinates	Reading
07/14/99	E6,E7	Less Than Alarm Setpoint
07/07/99	E7,E8	Less Than Alarm Setpoint
07/09/99	E8,E9	Less Than Alarm Setpoint
07/13/99	E9,E10	Less Than Alarm Setpoint

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4.1.4 Lake Lindsay Caissons

The installation of caissons in the Lake Lindsay area was anticipated to generate some contaminated soil as caissons were drilled. The following table presents the field screening data for these caissons. The caisson identification is the column line and row designation from Figure 1.3.

Monitoring of the excavation/drill cuttings was based on whether the soil exceeded the alarm setting, which was 80 percent of the value indicative of soil exceeding the 7.1 pCi/g clean-up threshold. All readings were taken with a Ludlum 193 instrument. The table identifies the depth interval from which the material was recovered if the alarm was triggered. Contaminated caisson spoil was identified in caissons A.1-8, A.3-5, B-7, B-8, and B-9.

Table 4.1.4

Lake Lindsay Caissons

Date	Caisson Identification	Alarm	Depth of Contamination
09/03/99	A.1-6	Less than alarm Setpoint	N/A
09/08/99	A.1-7	Less than alarm Setpoint	N/A
09/13/99	A.1-8	Greater Than Alarm Setpoint	Second and Third Auger Down
09/07/99	A.3-5	Greater Than Alarm Setpoint	Third Auger Down
07/02/99	A-10	Less than alarm Setpoint	N/A
07/13/99	A-4	Less than alarm Setpoint	N/A
07/08/99 & 07/09/99	A-5	Less than alarm Setpoint	N/A
07/06/99	A-6	Less than alarm Setpoint	N/A
07/06/99 & 07/07/99	A-7	Less than alarm Setpoint	N/A
07/12/99	A-8	Less than alarm Setpoint	N/A
07/06/99 & 07/07/99	A-9	Less than alarm Setpoint	N/A
07/16/99	B-10	Less than alarm Setpoint	N/A
07/15/99	B-5	Less than alarm Setpoint	N/A
07/28/99	B-6	Less than alarm Setpoint	N/A
08/02/99	B-7	Greater Than Alarm Setpoint	Second Auger Down
09/15/99	B-7	Less than alarm Setpoint	N/A
09/14/99 & 09/15/99	B-8	Greater Than Alarm Setpoint	Contamination until second to last auger
07/16/99	B-9	Less than alarm Setpoint	N/A
07/19/99	B-9	Greater Than Alarm Setpoint	First and Second Auger after Rock
07/12/99 & 07/16/99	C-10	Less than alarm Setpoint	N/A
07/30/99	C-5	Less than alarm Setpoint	N/A
07/22/99	C-6	Less than alarm Setpoint	N/A
07/28/99	C-7	Less than alarm Setpoint	N/A
07/20/99	C-7.8	Less than alarm Setpoint	N/A
07/19/99	C-9	Less than alarm Setpoint	N/A

4.1.5 Lake Lindsay Slurry Wall Panels and Desanding

The slurry wall crosses the south end of the Lake Lindsay area. Six slurry wall panels from column A4 through A10 were monitored as they were excavated. The material was screened on a bucket-by-bucket basis in accordance with the modified procedure approved by USEPA (Attachment D).

The following table presents the screening data for those panels. All surveys were conducted using a Ludlum 193 detector. As shown on the table, no detections were recorded above the alarm level.

Following the construction of each panel, the slurry was processed to remove the sediment. This "desanding" operation generated sediment which was also screened for elevated radioactivity, above the alarm level. As shown on the table, no detections above the alarm level were noted.

Table 4.1.5

Lake Lindsay Slurry Wall and Desanding Results

Date	Coordinates	Alarm (Slurry Wall)	Alarm (Desanding)
08/18/99	A4,A5	Less than Alarm Setpoint	Less than Alarm Setpoint
08/25/99	A5,A6	Less than Alarm Setpoint	Less than Alarm Setpoint
08/30/99	A6,A7	Less than Alarm Setpoint	Less than Alarm Setpoint
09/09/99	A7,A8	Less than Alarm Setpoint	Less than Alarm Setpoint
09/18/99	A8,A9	Less than Alarm Setpoint	Less than Alarm Setpoint
09/16/99	A9,A10	Less than Alarm Setpoint	Less than Alarm Setpoint

4.2 Laboratory Analytical Data

Off-site gamma screening was performed at RSSI's laboratory in Morton Grove, Illinois. This gamma spectroscopy system consists of a Canberra Geli 7500 detector in addition to a power supply, amplifier, preamp, and capture and analyses software. RSSI uses PCA-11 software for data capture and GDR software for analysis. The GDR software has libraries of radionuclides that were created specifically for the River East site. Samples collected were placed in 500 ml Marinelli beakers for analysis.

Field laboratory gamma screening was performed in the laboratory space on the adjacent property. Samples collected were placed in 20 ml liquid scintillation vials for analysis. The well counter, a Model 2007P NaI (TI) crystal, was connected to an amp, pre-amp and the output to a PC. This PC ran two sets of software, Nutranl the analysis software, and Genie-2000 gamma-spectroscopy capture and analysis system. The Genie software captured the data and Nutranl analyzed the U-238, Th-232 (for Ra-228), Ra-226 and K-40. Nutranl gives results in pCi/g (pico Curies per gram).

The off-site analysis also included select samples being sent to Quanterra, a subcontracted commercial laboratory in Earth City, Missouri. Quanterra analysis were typically used as duplicate or verification analysis in support of either the Morton Grove or field laboratories.

The laboratory data includes analysis from:

- Soil and asphalt verification samples.
- Sediment recovered from the desilting basins which were part of the Lake Lindsay dewatering system.

- Air monitoring filter samples including site area samples and personal air monitoring samples.
- Personnel radiation monitoring.

Particulate air monitoring was also provided during excavation in Lake Lindsay, in accordance with Health and Safety Plan Section 7.1. Those data are also included in Section 4.2.6.

4.2.1 Soil Sample and Asphalt Verification

As identified contamination areas were cleaned and field screening indicated the soil was at or below the 7.1 pCi/g clean-up objective, the area was first surveyed by USEPA representative and if no indication of the need for additional removal was noted, then samples were taken for verification of clean closure. The following table presents the results of those verification analyses.

The table presents verification analysis for soil and asphalt samples. The analyses of asphalt samples which are presented first, are for samples collected over areas of the site. The location designation represents the area of coverage rather than a specific point.

The soil analysis includes data from the various exclusion zones identified during the field screening, Areas 1 through 21 (Figure 1.2). The sample number includes a location designation referenced to the column lines and rows and may contain a N (north) or S (south) modifier for samples from larger areas requiring multiple verification samples. The Lake Lindsay area samples are from locations within the subdivided areas shown on Figure 2.1.

Sample numbers with an "A" designation following the sample number represent recount analysis of the same sample.

Several samples exceeded the 7.1 pCi/g clean-up threshold. Those locations were either further excavated and resampled, i.e., S-112/S-121, and S-198 through S-203/S-207 through S-209 or were averaged in a number of samples from a subdivided area, i.e., S-136 averaged in the A.5 - 9.5 area samples.

The northern-most line of verification cells within the Lake Lindsay area, C.1 - 4.5 through C.1 - 9.5 on Figure 2.1 were signed off by USEPA based on field screening only. No samples were collected and analyzed for this closure.

Table 4.2.1

Soil and Asphalt Verification Results

Sample ID		Date Collected	Date Analyzed	Ra-228 (pCi/g)	Ra-226 (pCi/g)	Total Radium (pCi/g)
ASPHALT						
Sample #	Location					
S3	B-C, 19-22		08/09/99	0.11±0.45	1.85±0.80	1.96
S6	D-E, 16-18		08/09/99	0.26±0.42	1.59±0.74	1.85
S8	B-C, 17-19		08/10/99	0.33±0.48	1.62±0.84	1.95
S9	C-D, 17-19		08/10/99	0.31±0.36	1.23±0.63	1.54
S12	C-D, 15_16		08/10/99	0.57±0.32	0.03±0.53	0.60
S14	C-D, 14-15		08/10/99	0.08±0.44	2.32±0.79	2.40
S15	C-D, 13-14		08/10/99	0.36±0.39	0.87±0.68	1.23
S16	D-E, 13-14		08/10/99	0.62±0.51	0.90±0.87	1.52
S23	C.8-D.5-3.5		08/12/99	0.48±0.45	0.61±0.77	1.09
S13	D-E, 14.5-16		08/10/99	0.28±0.36	1.44±0.62	2.72
S24	B-B.8, 3-4.5		08/12/99	0.51±0.48	1.40±0.82	2.01
S26	C-C.8, 3-4.5		08/12/99	0.16±0.39	1.61±0.68	1.77
S11	A-B, 17.5-18.5		08/10/99	1.24±0.34	1.22±0.57	2.46
S4	D-E, 18-19.5		08/09/99	0.60±0.36	0.85±0.62	1.45
S7	C-D, 18-19.5		08/09/99	0.83±0.45	1.73±0.77	2.56
S10	A-B, 18.5-20		08/10/99	0.31±0.37	1.86±0.66	2.17
S1	D-E, 19.5-22		08/09/99	0.24±0.41	0.98±0.69	1.22
S2	A-B, 19.5-22		08/09/99	0.46±0.55	1.39±0.96	1.85
S27	C-D, 21.5-22		08/12/99	0.40±0.45	1.21±0.79	1.61
S21	D-E, 5-6.5		08/12/99	0.39±0.42	1.52±0.72	1.91
S22	C-C.8, 4.5-6.5		08/12/99	0.05±0.31	1.25±0.55	1.30
S20	D-E, 7-8		08/10/99	1.22±0.53	0.88±0.88	2.10
S19	D-E, 8-10		08/10/99	0.42±0.48	1.16±0.83	1.58
S25	A-B, 9-11		08/12/99	0.24±0.46	0.95±0.78	1.19
S18	D-E, 10-12		08/10/99	-0.07±0.52	1.66±0.92	1.59
S17	D-E, 11-12		08/10/99	0.54±0.37	1.12±0.64	1.66
EXCLUSION ZONES						
Area	Sample ID	Date Collected	Date Analyzed	Radium 226 (pCi/g)	Radium 228 (pCi/g)	Total Radium (pCi/g)
1	B-21N	06/03/99	06/03/99	3.19±0.355	<1.57	<4.76
1	B-21S	06/03/99	06/03/99	2.01±0.236	<1.49	<3.5
2	B-18	06/03/99	06/03/99	<1.80	<3.05	<4.85
3	B.8-17.5	06/08/99	06/09/99	<0.984	1.75±0.244	<2.405
4	C.2-20	06/07/99	06/08/99	<1.50±0.228	<1.32	<2.82
5	E-15.5	06/07/99	06/08/99	<1.16	2.96±0.339	<4.12
6	C.8-18.5	06/07/99	06/08/99	<1.20	2.36±0.313	<3.56
7	B.6-17	06/07/99	06/08/99	<0.871	<0.992	<1.86
8	D-21.5	06/08/99	06/09/99	<0.655	<0.903	<1.558
9	C-22	06/08/99	06/09/99	1.29±0.173	<1.06	<2.35
10	E-22	06/08/99	06/09/99	<0.721	<0.805	<1.526
11	D.7-11.5	06/09/99	06/10/99	1.54±0.193	<0.124	<2.78
11	D.7-12.5	06/09/99	06/10/99	1.16±0.156	<0.109	<1.269
12	E-14.5	06/09/99	06/10/99	<0.744	<0.925	<1.669
13	A.2-17	06/11/99	06/15/99	<0.710	<1.11	<1.82

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a

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$$1.44 + 1.28 = 1.72$$

$$.51 + 1.40 = 1.91$$

$$.984 + 1.75 = 2.734$$

$$1.54 + .124 = 1.664$$

Table 4.2.1

Soil and Asphalt Verification Results

Sample ID		Date Collected	Date Analyzed	Ra-228 (pCi/g)	Ra-226 (pCi/g)	Total Radium (pCi/g)
14	C.2-13.5	06/11/99	06/15/99	2.05±0.271	<2.08	<4.13
15	C.8-11.5	06/11/99	06/15/99	1.86±0.209	<1.56	<3.42
16	D.2-14	06/11/99	06/15/99	<0.763	<0.851	<1.614
16	D-12.5	06/11/99	06/15/99	<1.19	2.93±0.298	<4.12
16	D-13	06/11/99	06/15/99	1.73±0.197	2.60±0.285	4.33
17	D.5-10.5	06/11/99	06/15/99	<1.34	<1.82	<3.16
18	C.8-11	06/14/99	06/15/99	2.51±0.246	<1.58	<4.09
18	C.8-11 Quanterra	06/14/99	06/23/99	1.37± 0.13	1.16 ± 0.12	2.53
19	D-12	06/16/99	06/16/99	2.77±0.252	<2.04	<4.81
19	D-12 Quanterra	06/16/99	06/23/99	1.42 ± 0.14	1.84 ± 0.16	3.26
20	D.8-6.5	06/24/99	06/24/99	1.61±0.177	<1.23	<2.84
21	E-14.75	06/29/99	06/29/99	<0.681	<0.709	<1.39
LAKE LINDSAY						
S142	10/6-1	10/06/99	10/06/99	1.00±0.49	2.04±0.85	3.04
S109	A.1-4.5	09/30/99	09/30/99	0.11±0.35	1.60±0.63	1.71
S110	A.1-4.5	09/30/99	09/30/99	1.06±1.03	3.07±1.78	4.13
S111	A.1-4.5	09/30/99	09/30/99	0.35±0.34	1.48±0.60	1.83
S113	A.1-5.5	10/01/99	10/01/99	14.13±0.81	0.57±1.08	14.70
S123	A.1-8.2	10/04/99	10/04/99	0.52±0.47	1.66±0.83	2.18
S124	A.1-8.4	10/04/99	10/04/99	1.01±0.55	2.32±0.93	3.33
S125	A.1-8.6	10/04/99	10/04/99	10.66±0.73	4.13±1.07	14.79
S129	A.1-8.6	10/04/99	10/04/99	0.62±0.61	2.24±1.08	2.86
S126	A.1-8.8	10/04/99	10/04/99	3.47±1.24	5.64±2.03	9.11
S128	A.1-8.8	10/04/99	10/04/99	2.63±0.59	1.52±0.95	4.15
S127	A.1-8.9	10/04/99	10/04/99	2.32±0.66	2.48±1.08	4.80
S122	A.2-5.5	10/02/99	10/04/99	1.56±0.67	1.90±1.11	3.46
S130	A.5-7.5	10/04/99	10/04/99	0.66±0.33	0.68±0.56	1.34
S131	A.5-7.5	10/04/99	10/04/99	0.74±0.54	1.47±0.93	2.21
S132	A.5-7.5	10/04/99	10/04/99	0.97±0.35	1.10±0.60	2.07
S133	A.5-8.5	10/04/99	10/04/99	1.30±0.65	4.52±1.13	5.82
S134	A.5-8.5	10/04/99	10/04/99	1.95±0.64	3.54±1.07	5.49
S135	A.5-8.5	10/04/99	10/04/99	1.12±0.59	5.21±1.04	6.31
S136	A.5-9.5	10/04/99	10/04/99	2.12±0.64	5.29±1.08	7.41
S137	A.5-9.5	10/04/99	10/04/99	2.72±0.62	3.18±1.00	5.90
S138	A.5-9.5	10/04/99	10/04/99	2.66±0.67	2.92±1.10	5.58
Quanterra	A.5 - 9.5	10/05/99	10/06/99	0.37 ± 0.05	1.34 ± 0.11	1.71
S106	A.6-4.5	09/30/99	09/30/99	0.52±0.44	1.06±0.77	1.58
S107	A.6-4.5	9/30/99	9/30/99	0.92±0.51	1.07±0.86	1.99
S108	A.6-4.5	09/30/99	09/30/99	0.66±0.39	1.29±0.68	1.95
S114	A.6-5.5	10/01/99	10/01/99	0.64±0.33	1.13±0.57	1.77
S115	A.6-5.5	10/01/99	10/01/99	1.12±0.39	1.54±0.66	2.66
S116	A.6-5.5	10/01/99	10/01/99	1.68±0.55	2.08±0.90	3.76
S117	A.6-6.5	10/01/99	10/01/99	0.73±0.93	2.23±1.59	2.96
S118	A.6-6.5	10/01/99	10/01/99	0.61±0.36	0.87±0.61	1.48
S119	A.6-6.5	10/01/99	10/01/99	0.51±0.40	1.50±0.70	2.01

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$$1.12 + 5.21 = 6.33$$

Table 4.2.1

Soil and Asphalt Verification Results

Sample ID		Date Collected	Date Analyzed	Ra-228 (pCi/g)	Ra-226 (pCi/g)	Total Radium (pCi/g)
S143	A.8-4.5	10/06/99	10/06/99	0.64±0.46	1.04±0.79	1.68
S144	A.8-4.5	10/06/99	10/06/99	0.65±0.35	0.45±0.59	1.10
S145	A.8-4.5	10/06/99	10/06/99	0.37±0.29	0.45±0.50	0.82
S146	A.8-5.5	10/06/99	10/06/99	4.77±0.50	1.01±0.74	4.78
S147	A.8-5.5	10/06/99	10/06/99	4.66±0.47	0.22±0.69	4.88
S148	A.8-5.5	10/06/99	10/06/99	4.56±0.42	1.10±0.62	5.66
S149	A.8-6.5	10/06/99	10/06/99	1.01±0.36	0.76±0.59	1.77
S150	A.8-6.5	10/06/99	10/06/99	1.58±0.39	0.47±0.64	2.05
S151	A.8-6.5	10/06/99	10/06/99	1.08±0.32	0.92±0.54	2.00
S152	A.8-7.5	10/06/99	10/06/99	1.87±0.49	1.99±0.81	3.86
S153	A.8-7.5	10/06/99	10/06/99	1.98±0.48	1.31±0.77	3.29
S154	A.8-7.5	10/06/99	10/06/99	2.09±0.42	1.46±0.69	3.55
S155	A.8-8.5	10/08/99	10/08/99	1.38±0.94	3.93±1.59	5.31
S156	A.8-8.5	10/08/99	10/08/99	1.48±0.59	3.80±1.58	3.36
S157	A.8-8.5	10/08/99	10/08/99	1.63±0.69	3.44±1.16	5.07
S158	A.8-9.5	10/08/99	10/08/99	1.50±0.59	1.86±0.98	3.36
S159	A.8-9.5	10/08/99	10/08/99	0.46±0.34	3.68±0.59	4.14
S160	A.8-9.5	10/08/99	10/08/99	1.46±0.64	2.71±1.08	4.17
S112	A-5.5	10/01/99	10/01/99	18.01±1.34	3.08±1.82	21.09
S121	A-5.5-2	10/02/99	10/04/99	0.32±0.42	1.34±0.75	1.66
S166	B.4-5.5	10/08/99	10/08/99	0.75±0.55	1.88±0.93	2.63
S167	B.4-5.5	10/11/99	10/11/99	0.80±0.40	1.82±0.69	2.62
S168	B.4-5.5	10/11/99	10/11/99	1.37±0.51	1.33±0.85	2.70
S169	B.4-6.5	10/11/99	10/11/99	0.20±0.51	2.10±0.91	2.30
S170	B.4-6.5	10/11/99	10/11/99	1.01±0.47	1.15±0.78	2.16
S171	B.4-6.5	10/11/99	10/11/99	0.98±0.43	1.29±0.72	2.27
S192	B.4-7.5	10/15/99	10/15/99	0.96±0.38	0.59±0.63	1.55
S193	B.4-7.5	10/15/99	10/15/99	0.44±0.57	1.69±0.97	2.13
S194	B.4-7.5	10/15/99	10/15/99	0.40±0.38	1.86±0.66	2.26
S198	B.4-8.5	10/21/99	10/21/99	2.74±1.08	6.86±1.87	9.60
S199	B.4-8.5	10/21/99	10/21/99	2.74±0.87	5.37±1.48	8.11
S200	B.4-8.5	10/21/99	10/21/99	3.54±1.21	6.57±2.04	10.11
S201	B.4-8.5	10/21/99	10/21/99	3.03±0.91	6.39±1.53	9.42
S202	B.4-8.5	10/21/99	10/21/99	3.90±1.04	6.06±1.70	9.96
S203	B.4-8.5	10/21/99	10/21/99	2.39±0.88	6.90±1.53	9.29
S207	B.4-8.5	10/21/99	10/21/99	0.46±0.54	2.13±0.95	2.59
S208	B.4-8.5	10/21/99	10/21/99	0.73±0.87	3.74±1.53	4.47
S209	B.4-8.5	10/21/99	10/21/99	0.88±0.45	1.67±0.78	2.55
S198A	B.4-8.5 Recount	10/21/99	10/21/99	3.34±1.04	6.22±1.76	9.56
S199A	B.4-8.5 Recount	10/21/99	10/21/99	2.41±0.82	6.69±1.41	9.10
S200A	B.4-8.5 Recount	10/21/99	10/21/99	3.97±1.08	6.53±1.79	10.50
S195	B.4-9.5	10/21/99	10/21/99	0.26±0.54	2.09±0.96	2.35
S196	B.4-9.5	10/21/99	10/21/99	0.76±0.77	2.20±1.33	2.96

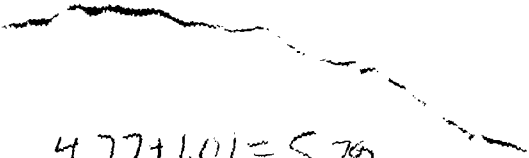
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c

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$$4.77 + 1.01 = 5.78$$

$$1.48 + 3.80 = 5.28$$

Table 4.2.1

Soil and Asphalt Verification Results

Sample ID		Date Collected	Date Analyzed	Ra-228 (pCi/g)	Ra-226 (pCi/g)	Total Radium (pCi/g)
S197	B.4-9.5	10/21/99	10/21/99	0.27±0.47	2.06±0.81	2.33
S161	B.5-4.5	10/08/99	10/08/99	0.17±0.49	1.52±0.85	1.69
S162	B.5-4.5	10/08/99	10/08/99	0.39±0.48	1.19±0.82	1.58
S163	B.5-4.5	10/08/99	10/08/99	0.49±0.44	0.97±0.75	1.46
S173	B.8-4.5	10/13/99	10/13/99	1.10±0.51	0.61±0.83	1.71
S174	B.8-4.5	10/13/99	10/13/99	1.25±0.62	0.95±1.02	2.20
S175	B.8-4.5	10/13/99	10/13/99	1.08±0.39	0.30±0.66	1.38
S176	B.8-5.5	10/13/99	10/13/99	0.93±0.42	0.53±0.69	1.46
S177	B.8-5.5	10/13/99	10/13/99	0.70±0.44	1.67±0.76	1.37
S178	B.8-5.5	10/13/99	10/13/99	0.33±0.43	1.57±0.76	1.90
S180	B.8-6.5	10/14/99	10/14/99	0.51±0.49	1.80±0.85	2.31
S181	B.8-6.5	10/14/99	10/14/99	0.23±0.45	1.26±0.78	1.49
S182	B.8-6.5	10/14/99	10/14/99	0.91±0.63	1.24±1.05	1.15
S183	B.8-7.5	10/14/99	10/14/99	0.48±0.37	0.88±0.63	1.36
S184	B.8-7.5	10/14/99	10/14/99	0.52±0.42	1.77±0.72	2.29
S185	B.8-7.5	10/14/99	10/14/99	0.50±0.50	1.51±0.86	2.01
S186	B.8-8.5	10/14/99	10/14/99	2.14±0.66	3.08±1.10	5.22
S187	B.8-8.5	10/14/99	10/14/99	1.55±0.52	2.20±0.86	3.75
S188	B.8-8.5	10/14/99	10/14/99	1.94±0.68	2.93±1.13	4.87
S189	B.8-9.5	10/15/99	10/15/99	0.98±0.68	4.22±1.19	5.20
S190	B.8-9.5	10/15/99	10/15/99	0.93±0.56	4.72±0.99	5.65
S191	B.8-9.5	10/15/99	10/15/99	1.37±0.43	1.88±0.71	3.25
S140	B-4.3	10/05/99	10/05/99	1.78±0.41	0.84±0.66	2.62
S141	B-4.6	10/05/99	10/05/99	1.48±0.37	1.58±0.62	3.06
S204	B-8 Caisson	10/21/99	10/21/99	1.88±0.67	3.40±1.11	5.28
S205	B-8 Caisson	10/21/99	10/21/99	1.78±0.71	4.19±1.21	5.97
S206	B-8 Caisson	10/21/99	10/21/99	2.20±0.71	2.08±1.16	4.28

$$0.70 + 1.67 = 2.37$$

$$0.91 + 1.24 = 2.15$$

Table 4.2.1

Sample ID

Sample ID	
Sample #	Location
1	B-21N
1	B-21S
2	B-18
3	B.8-17.5
4	C.2-20
5	E-15.5
6	C.8-18.5
7	B.6-17
8	D-21.5
9	C-22
10	E-22
11	D.7-11.5
11	D.7-12.5
12	E-14.5
13	A.2-17
14	C.2-13.5
15	C.8-11.5
16	D.2-14
16	D-12.5
16	D-13
17	D.5-10.5
18	C.8-11
19	D-12
20	D.8-6.5
21	E-14.75
S1	D-E, 19.5-22
S2	A-B, 19.5-22
S3	B-C, 19-22
S4	D-E, 18-19.5
S6	D-E, 16-18
S7	C-D, 18-19.5
S8	B-C, 17-19
S9	C-D, 17-19
S10	A-B, 18.5-20
S11	A-B, 17.5-18.5
S12	C-D, 15_16
S13	D-E, 14.5-16
S14	C-D, 14-15
S15	C-D, 13-14
S16	D-E, 13-14
S17	D-E, 11-12
S18	D-E, 10-12
S19	D-E, 8-10
S20	D-E, 7-8
S21	D-E, 5-6.5
S22	C-C.8, 4.5-6.5
S23	C.8-D.5-3.5

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Table 4.2.1

Sample ID

Sample ID	
S24	B-B.8, 3-4.5
S25	A-B, 9-11
S26	C-C.8, 3-4.5
S27	C-D, 21.5-22
S106	A.6-4.5
S107	A.6-4.5
S108	A.6-4.5
S109	A.1-4.5
S110	A.1-4.5
S111	A.1-4.5
S112	A-5.5
S113	A.1-5.5
S114	A.6-5.5
S115	A.6-5.5
S116	A.6-5.5
S117	A.6-6.5
S118	A.6-6.5
S119	A.6-6.5
S121	A-5.5-2
S122	A.2-5.5
S123	A.1-8.2
S124	A.1-8.4
S125	A.1-8.6
S126	A.1-8.8
S127	A.1-8.9
S128	A.1-8.8
S129	A.1-8.6
S130	A.5-7.5
S131	A.5-7.5
S132	A.5-7.5
S133	A.5-8.5
S134	A.5-8.5
S135	A.5-8.5
S136	A.5-9.5
S137	A.5-9.5
S138	A.5-9.5
S140	B-4.3
S141	B-4.6
S142	10/6-1
S143	A.8-4.5
S144	A.8-4.5
S145	A.8-4.5
S146	A.8-5.5
S147	A.8-5.5
S148	A.8-5.5
S149	A.8-6.5
S150	A.8-6.5
S151	A.8-6.5

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b

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Table 4.2.1

Sample ID

Sample ID	
S152	A.8-7.5
S153	A.8-7.5
S154	A.8-7.5
S155	A.8-8.5
S156	A.8-8.5
S157	A.8-8.5
S158	A.8-9.5
S159	A.8-9.5
S160	A.8-9.5
S161	B.5-4.5
S162	B.5-4.5
S163	B.5-4.5
S166	B.4-5.5
S167	B.4-5.5
S168	B.4-5.5
S169	B.4-6.5
S170	B.4-6.5
S171	B.4-6.5
S173	B.8-4.5
S174	B.8-4.5
S175	B.8-4.5
S176	B.8-5.5
S177	B.8-5.5
S178	B.8-5.5
S180	B.8-6.5
S181	B.8-6.5
S182	B.8-6.5
S183	B.8-7.5
S184	B.8-7.5
S185	B.8-7.5
S186	B.8-8.5
S187	B.8-8.5
S188	B.8-8.5
S189	B.8-9.5
S190	B.8-9.5
S191	B.8-9.5
S192	B.4-7.5
S193	B.4-7.5
S194	B.4-7.5
S195	B.4-9.5
S196	B.4-9.5
S197	B.4-9.5
S198	B.4-8.5
S198A	B.4-8.5 Recount
S199	B.4-8.5
S199A	B.4-8.5 Recount
S200	B.4-8.5
S200A	B.4-8.5 Recount

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Table 4.2.1

Sample ID

Sample ID	
S201	B.4-8.5
S202	B.4-8.5
S203	B.4-8.5
S204	B-8 Caisson
S205	B-8 Caisson
S206	B-8 Caisson
S207	B.4-8.5
S208	B.4-8.5
S209	B.4-8.5

4.2.2 Lake Lindsay Sediment

The dewatering system for the Lake Lindsay area included basins for settling suspended sediment from the water before it was discharged. That sediment potentially contained some of the thorium-impacted soil. As a result the sediment was sampled and analyzed before it was removed for disposal in order to determine if the material exhibited levels above the contamination threshold of 7.1 pCi/g.

The total radium values measured are below the specified threshold for all samples collected and analyzed.

Table 4.2.2

Lake Lindsay Sediment Samples

Sample Number	Date Collected	Date Analyzed	Ra-228 (pCi/g)	Ra-226 (pCi/g)	Total Radium (pCi/g)
S102 LL Sediment	09/22/99	09/22/99	0.54±0.41	0.89±0.70	1.43
S104 LL Sediment	09/24/99	09/29/99	0.15±0.37	1.62±0.65	1.77
S105 LL Sediment	09/27/99	09/29/99	0.35±0.44	1.71±0.77	2.06
S120 LL Sediment	10/01/99	10/04/99	0.53±0.27	1.13±0.46	1.66
S139 LL Sediment	10/04/99	10/05/99	0.35±0.41	0.46±0.72	0.81
S164 LL Sediment	10/07/99	10/09/99	0.24±0.41	1.25±0.72	1.49
S165 LL Sediment	10/08/99	10/09/99	0.24±0.41	1.25±0.72	1.49
S172 LL Sediment	10/11/99	10/12/99	0.37±0.56	1.44±0.97	1.91
S179 LL Sediment	10/14/99	10/14/99	0.87±0.51	0.96±0.87	1.83

$$.37 + 1.44 = 1.81$$

RSSI

Prepared By:

01/11/00

Eric S. Pittman, Lead HP

4.2.3 Site Air Monitoring

The River East site boundaries were monitored for airborne releases of radioactive fugitive dust. Monitoring employed four Eberline PAG-1 air pumps to collect samples. The pumps were set at 12 liters per minute and allowed to run daily while construction was occurring, with the exception of rain days. Table 4.2.3.1 presents these site border sample data collected and analyzed weekly. The analysis included an immediate reading and a recount after at least 4 days to allow for ingrowth of the daughter products. No data indicating an exceedance of the air quality criteria of 30% of the derived air concentration, 3×10^{-13} uCi/ml, (Health & Safety Plan Table 7-1) were noted in any of the site air monitoring data. Although some values on the initial count exceed the air quality criteria, none of the recount analysis after the required 4 day ingrowth period exceed the criteria.

In addition, the sampling filters were inspected and surveyed using hand-held instruments (GM Pancake and Ludlum 3 NaI detector) on a daily basis in accordance with the Work Plan. No detections above background were noted in this daily monitoring. These daily data readings are presented on Table 4.2.3.2.

Table 4.2.3.1

Area Air Monitoring Results

Location	Count	Collection	Analysis	Counts	Sampling	Conc.	Recount	Count	Conc.
	Time (m)	Date	Date		Time (Hrs)	uCi/mL		Time (m)	uCi/mL
N	60	6/8/99	6/11/99	7	60	8.95E-15	N/A	N/A	N/A
S	60	6/8/99	6/11/99	5	60	6.39E-15	N/A	N/A	N/A
E	60	6/8/99	6/11/99	6	60	7.67E-15	N/A	N/A	N/A
W	60	6/8/99	6/11/99	2	60	2.56E-15	N/A	N/A	N/A
N	60	6/12/99	6/19/99	52	46	8.67E-14	N/A	N/A	N/A
S	60	6/12/99	6/19/99	51	46	8.50E-14	N/A	N/A	N/A
E	60	6/12/99	6/19/99	32	46	5.33E-14	N/A	N/A	N/A
W	60	6/12/99	6/19/99	40	46	6.67E-14	N/A	N/A	N/A
N	60	6/19/99	6/19/99	310	51.5	4.62E-13	4	60	5.96E-15
S	60	6/19/99	6/19/99	1515	49.5	2.35E-12	5	60	7.75E-15
E	60	6/19/99	6/19/99	275	52.5	4.02E-13	3	60	4.38E-15
W	60	6/19/99	6/19/99	748	50.5	1.14E-12	9	60	1.37E-14
N	60	6/26/99	6/29/99	7	32	1.68E-14	2	60	4.79E-15
S	60	6/26/99	6/29/99	7	32	1.68E-14	6	60	1.44E-14
E	60	6/26/99	6/29/99	16	32	3.83E-14	2	60	4.79E-15
W	60	6/26/99	6/29/99	6	32	1.44E-14	6	60	1.44E-14
N	60	7/2/99	7/6/99	5	38	1.01E-14	9	60	1.82E-14
S	60	7/2/99	7/6/99	5	38	1.01E-14	0	60	0.00E+00
E	60	7/2/99	7/6/99	10	30	2.56E-14	3	60	7.67E-15
W	60	7/2/99	7/6/99	0	38	0.00E+00	3	60	6.05E-15
N	60	7/12/99	7/13/99	5	32	1.20E-14	4	60	9.58E-15
S	60	7/12/99	7/13/99	3	32	7.19E-15	8	60	1.92E-14
E	60	7/12/99	7/13/99	5	32	1.20E-14	3	60	7.19E-15
W	60	7/12/99	7/13/99	6	32	1.44E-14	3	60	7.19E-15
N	60	7/19/99	7/19/99	12	40	2.30E-14	5	60	9.58E-15
S	60	7/19/99	7/19/99	13	40	2.49E-14	4	60	7.67E-15
E	60	7/19/99	7/19/99	16	40	3.07E-14	8	60	1.53E-14
W	60	7/19/99	7/19/99	9	40	1.73E-14	8	60	1.53E-14
N	60	7/24/99	7/26/99	17	40	3.26E-14	15	60	2.88E-14
S	60	7/24/99	7/26/99	10	40	1.92E-14	13	60	2.49E-14
E	60	7/24/99	7/26/99	12	40	2.30E-14	10	60	1.92E-14
W	60	7/24/99	7/26/99	20	40	3.83E-14	11	60	2.11E-14
N	120	8/2/99	8/2/99	55	32.5	6.49E-14	21	120	2.48E-14
S	120	8/2/99	8/2/99	54	32.5	6.37E-14	12	120	1.42E-14
E	120	8/2/99	8/2/99	42	32.5	4.95E-14	11	120	1.30E-14
W	120	8/2/99	8/2/99	50	32.5	5.90E-14	8	120	9.44E-15
N	120	8/9/99	8/9/99	9	28.5	1.21E-14	9	120	1.21E-14
S	120	8/9/99	8/9/99	23	32.5	2.71E-14	21	120	2.48E-14
E	120	8/9/99	8/9/99	14	32.5	1.65E-14	9	120	1.06E-14
W	120	8/9/99	8/9/99	17	28.5	2.29E-14	10	120	1.35E-14
N	120	8/16/99	8/16/99	39	29	5.16E-14	8	120	1.06E-14
S	120	8/16/99	8/16/99	14	30.5	1.76E-14	7	120	8.80E-15
E	120	8/16/99	8/16/99	14	30.5	1.76E-14	13	120	1.63E-14
W	120	8/16/99	8/16/99	17	29	2.25E-14	12	120	1.59E-14

Prepared By:

Table 4.2.3.1

Area Air Monitoring Results

Location	Count	Collection	Analysis	Counts	Sampling	Conc.	Recount	Count	Conc.
	Time (m)	Date	Date		Time (Hrs)	uCi/mL		Time (m)	uCi/mL
N	120	8/23/99	8/23/99	11	33	1.28E-14	9	120	1.05E-14
S	120	8/23/99	8/23/99	20	42.5	1.80E-14	9	120	8.12E-15
E	120	8/23/99	8/23/99	20	44	1.74E-14	15	120	1.31E-14
W	120	8/23/99	8/23/99	11	33	1.28E-14	7	120	8.13E-15
N	120	8/30/99	8/30/99	12	40	1.15E-14	68	600	1.30E-14
S	120	8/30/99	8/30/99	14	41.5	1.29E-14	52	600	9.61E-15
E	120	8/30/99	8/30/99	12	41.5	1.11E-14	65	600	1.20E-14
W	120	8/30/99	8/30/99	7	40	6.71E-15	48	600	9.20E-15
N	600	9/3/99	9/3/99	530	27.5	1.48E-13	10	60	2.79E-14
S	600	9/3/99	9/3/99	927	37.5	1.90E-13	5	60	1.02E-14
E	600	9/3/99	9/3/99	90	37.5	1.84E-14	2	60	4.09E-15
W	600	9/3/99	9/3/99	1034	27.5	2.88E-13	8	60	2.23E-14
N	60	9/13/99	9/16/99	7	34.25	1.57E-14	2	60	4.48E-15
S	60	9/13/99	9/16/99	2	31	4.95E-15	2	60	4.95E-15
E	60	9/13/99	9/16/99	11	37	2.28E-14	2	60	4.14E-15
W	60	9/13/99	9/16/99	6	34.25	1.34E-14	7	60	1.57E-14
N	60	9/20/99	9/20/99	11	37	2.28E-14	5	60	1.04E-14
S	60	9/20/99	9/20/99	8	42.5	1.44E-14	7	60	1.26E-14
E	60	9/20/99	9/20/99	6	44.75	1.03E-14	4	60	6.85E-15
W	60	9/20/99	9/20/99	13	45	2.22E-14	2	60	3.41E-15
N	60	9/27/99	9/27/99	12	47.5	1.94E-14	1	60	1.61E-15
S	60	9/27/99	9/27/99	3	48.5	4.74E-15	11	60	1.74E-14
E	60	9/27/99	9/27/99	3	48.5	4.74E-15	3	60	4.74E-15
W	60	9/27/99	9/27/99	2	47.5	3.23E-15	9	60	1.45E-14
N	60	9/27/99	10/4/99	8	18.92	3.24E-14	0	60	0.00E+00
S	60	9/27/99	10/4/99	8	18.92	3.24E-14	0	60	0.00E+00
E	60	9/27/99	10/4/99	5	18.92	2.03E-14	0	60	0.00E+00
W	60	9/27/99	10/4/99	10	18.92	4.05E-14	0	60	0.00E+00
N	60	10/4/99	10/11/99	18	60.25	2.29E-14	6	60	7.64E-15
S	60	10/4/99	10/11/99	25	60.25	3.18E-14	3	60	3.82E-15
E	60	10/4/99	10/11/99	18	60.25	2.29E-14	5	60	6.36E-15
W	60	10/4/99	10/11/99	24	60.25	3.05E-14	6	60	7.64E-15
N	60	10/12/99	10/18/99	27	35	5.92E-14	3	60	6.57E-15
S	60	10/12/99	10/18/99	28	35	6.13E-14	5	60	1.10E-14
E	60	10/12/99	10/18/99	23	35	5.04E-14	2	60	4.38E-15
W	60	10/12/99	10/18/99	28	35	6.13E-14	10	60	2.19E-14
N	60	10/18/99	10/22/99	37	17.75	1.60E-13	3	60	1.30E-14
S	60	10/18/99	10/22/99	42	17.75	1.81E-13	3	60	1.30E-14
E	60	10/18/99	10/22/99	31	17.75	1.34E-13	0	60	0.00E+00
W	60	10/18/99	10/22/99	31	17.75	1.34E-13	1	60	4.32E-15

Flowrate = 12 lpm

NDA = No detectable activity

MDA = Minimum Detectable Activity

N/A = Not available, filters discarded

Prepared By:

Table 4.2.3.2

Daily Check of the Air Monitor Filter for Contamination

Date	Instrument	Probe	Serial Number	Results
06/07/99	Ludlum-3	44-9	29584	At Background
06/08/99	Ludlum-3	44-9	29584	At Background
06/09/99	Ludlum-3	44-9	29584	At Background
06/10/99	Ludlum-3	44-9	29584	At Background
06/11/99	Ludlum-3	44-9	29584	At Background
06/14/99	Ludlum-3	44-9	29584	At Background
06/15/99	Ludlum-3	44-9	29584	At Background
06/16/99	Ludlum-3	44-9	29584	At Background
06/17/99	Ludlum-3	44-9	29584	At Background
06/18/99	Ludlum-3	44-9	29584	At Background
06/21/99	Ludlum-3	44-9	29584	At Background
06/22/99	Ludlum-3	44-9	29584	At Background
06/23/99	Ludlum-3	44-9	29584	At Background
06/24/99	Ludlum-3	44-9	29584	At Background
06/25/99	Ludlum-3	44-9	29584	At Background
06/28/99	Ludlum-3	44-9	29584	At Background
06/29/99	Ludlum-3	44-9	29584	At Background
06/30/99	Ludlum-3	44-9	29584	At Background
07/01/99	Ludlum-3	44-9	29584	At Background
07/02/99	Ludlum-3	44-9	29584	At Background
07/05/99	Ludlum-3	44-9	29584	At Background
07/06/99	Ludlum-3	44-9	29584	At Background
07/07/99	Ludlum-3	44-9	29584	At Background
07/08/99	Ludlum-3	44-9	29584	At Background
07/09/99	Ludlum-3	44-9	29584	At Background
07/12/99	Ludlum-3	44-9	29584	At Background
07/13/99	Ludlum-3	44-9	29584	At Background
07/14/99	Ludlum-3	44-9	29584	At Background
07/15/99	Ludlum-3	44-9	29584	At Background
07/16/99	Ludlum-3	44-9	29584	At Background
07/19/99	Ludlum-3	44-9	29584	At Background
07/20/99	Ludlum-3	44-9	29584	At Background
07/21/99	Ludlum-3	44-9	29584	At Background
07/22/99	Ludlum-3	44-9	29584	At Background
07/23/99	Ludlum-3	44-9	29584	At Background
07/26/99	Ludlum-3	44-9	29584	At Background
07/27/99	Ludlum-3	44-9	29584	At Background
07/28/99	Ludlum-3	44-9	29584	At Background
07/29/99	Ludlum-3	44-9	29584	At Background
07/30/99	Ludlum-3	44-9	29584	At Background
08/02/99	Ludlum-3	44-9	29584	At Background
08/03/99	Ludlum-3	44-9	29584	At Background
08/04/99	Ludlum-3	44-9	29584	At Background

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Prepared by:

01/07/00

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Table 4.2.3.2

Daily Check of the Air Monitor Filter for Contamination

Date	Instrument	Probe	Serial Number	Results
08/05/99	Ludlum-3	44-9	29584	At Background
08/06/99	Ludlum-3	44-9	29584	At Background
08/09/99	Ludlum-3	44-9	29584	At Background
08/10/99	Ludlum-3	44-9	29584	At Background
08/11/99	Ludlum-3	44-9	29584	At Background
08/12/99	Ludlum-3	44-9	29584	At Background
08/13/99	Ludlum-3	44-9	29584	At Background
08/16/99	Ludlum-3	44-9	29584	At Background
08/17/99	Ludlum-3	44-9	29584	At Background
08/18/99	Ludlum-3	44-9	29584	At Background
08/19/99	Ludlum-3	44-9	29584	At Background
08/20/99	Ludlum-3	44-9	29584	At Background
08/23/99	Ludlum-3	44-9	29584	At Background
08/24/99	Ludlum-3	44-9	29584	At Background
08/25/99	Ludlum-3	44-9	29584	At Background
08/26/99	Ludlum-3	44-9	29584	At Background
08/27/99	Ludlum-3	44-9	29584	At Background
08/30/99	Ludlum-3	44-9	29584	At Background
08/31/99	Ludlum-3	44-9	29584	At Background
09/01/99	Ludlum-3	44-9	29584	At Background
09/02/99	Ludlum-3	44-9	29584	At Background
09/03/99	Ludlum-3	44-9	29584	At Background
09/06/99	Ludlum-3	44-9	29584	At Background
09/07/99	Ludlum-3	44-9	29584	At Background
09/08/99	Ludlum-3	44-9	29584	At Background
09/09/99	Ludlum-3	44-9	29584	At Background
09/10/99	Ludlum-3	44-9	29584	At Background
09/13/99	Ludlum-3	44-9	29584	At Background
09/14/99	Ludlum-3	44-9	29584	At Background
09/15/99	Ludlum-3	44-9	29584	At Background
09/16/99	Ludlum-3	44-9	29584	At Background
09/17/99	Ludlum-3	44-9	29584	At Background
09/20/99	Ludlum-3	44-9	29584	At Background
09/21/99	Ludlum-3	44-9	29584	At Background
09/22/99	Ludlum-3	44-9	29584	At Background
09/23/99	Ludlum-3	44-9	29584	At Background
09/24/99	Ludlum-3	44-9	29584	At Background
09/27/99	Ludlum-3	44-9	29584	At Background
09/28/99	Ludlum-3	44-9	29584	At Background
09/29/99	Ludlum-3	44-9	29584	At Background
09/30/99	Ludlum-3	44-9	29584	At Background
10/01/99	Ludlum-3	44-9	29584	At Background
10/04/99	Ludlum-3	44-9	29584	At Background
10/05/99	Ludlum-3	44-9	29584	At Background
10/06/99	Ludlum-3	44-9	29584	At Background

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Prepared by:

01/07/00

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Table 4.2.3.2

Daily Check of the Air Monitor Filter for Contamination

Date	Instrument	Probe	Serial Number	Results
10/07/99	Ludlum-3	44-9	29584	At Background
10/08/99	Ludlum-3	44-9	29584	At Background
10/09/99	Ludlum-3	44-9	29584	At Background
10/11/99	Ludlum-3	44-9	29584	At Background
10/12/99	Ludlum-3	44-9	29584	At Background
10/13/99	Ludlum-3	44-9	29584	At Background
10/14/99	Ludlum-3	44-9	29584	At Background
10/15/99	Ludlum-3	44-9	29584	At Background
10/16/99	Ludlum-3	44-9	29584	At Background
10/18/99	Ludlum-3	44-9	29584	At Background
10/19/99	Ludlum-3	44-9	29584	At Background
10/20/99	Ludlum-3	44-9	29584	At Background

4.2.4 Personal Air Monitoring Results

The personal air monitoring (PAM) program for the River East site used Gilian Model HFS113A Hi-Flow samplers set at 2 liters per minute. The pump was worn on the participants' belt with the air filter worn in the breathing zone connected with a lapel clip to the lapel. Every filter that was collected from an individual was analyzed for radioactive particulate matter. These results were then converted to a concentration in mCi/ml (micro Curies per milliliter). After at least a four day waiting period the filters were recounted and the results recorded in the table.

All PAM data were below regulated exposure limits.

Table 4.2.4
Personal Air Monitoring Results

Sample ID	Name	Collection Date	Analysis Date	Counts	Sampling Time Hours	Concentration uCi/ml	Recount	Concentration uCi/mL
1	Krueger, Bill	06/01/99	06/04/99	2	2.48	<MDA	0	NDA
2	Jensen, Larry	06/01/99	06/04/99	2	1.18	<MDA	0	NDA
3	Krueger, Bill	06/02/99	06/04/99	2	4.32	<MDA	0	NDA
4	Sworek, Andy	06/02/99	06/04/99	2	2.45	<MDA	N/A	N/A
5	Sworek, Andy	06/03/99	06/04/99	3	8.93	2.18E-14	0	NDA
6	VanDerKarr, Mike	06/03/99	06/04/99	3	3.02	6.46E-14	N/A	N/A
7	Huber, Glenn	06/04/99	06/04/99	13	2.10	4.02E-13	0	NDA
8	Sworek, Andy	06/04/99	06/07/99	4	4.00	6.50E-14	0	NDA
9	Allore, Jennifer	06/04/99	06/04/99	11	2.00	3.58E-13	1	3.25E-14
10	Krueger, Bill	06/04/99	06/07/99	8	2.62	1.98E-13	4	9.92E-14
11	Sworek, Andy	06/07/99	06/11/99	3	8.17	2.39E-14	0	NDA
12	Hernandez, Tony	06/07/99	06/11/99	4	6.25	4.16E-14	0	NDA
13	Hernandez, Tony	06/08/99	06/11/99	5	6.73	4.83E-14	0	NDA
14	Sworek, Andy	06/08/99	06/11/99	4	5.73	4.54E-14	0	NDA
15	Sworek, Andy	06/09/99	06/11/99	4	11.38	2.28E-14	0	NDA
16	Hernandez, Tony	06/09/99	06/11/99	11	8.80	8.13E-14	0	NDA
17	Sworek, Andy	06/10/99	06/11/99	3	7.33	2.66E-14	2	1.77E-14
18	Hernandez, Tony	06/10/99	06/11/99	3	4.00	4.88E-14	0	NDA
19	Sworek, Andy	06/11/99	06/11/99	14	7.00	1.30E-13	1	9.29E-15
20	Hernandez, Tony	06/11/99	06/11/99	12	4.67	1.67E-13	3	4.18E-14
21	Laughlin, Brian	09/07/99	09/07/99	6	0.82	2.82E-13	1	7.93E-14
22	Petty, Roger	09/15/99	09/21/99	4	1.25	2.08E-13	0	NDA
23	Huber, Glenn	09/30/99	10/01/99	16	3	3.47E-13	4	8.67E-14
24	Petty Roger	09/30/99	10/01/99	10	3	2.17E-13	0	NDA
25	Huber, Glenn	10/01/99	10/04/99	0	6	NDA	0	NDA
26	Petty, Roger	10/01/99	10/04/99	0	8.11	NDA	0	NDA
27	Laughlin, Brian	10/01/99	10/04/99	1	2	<MDA	0	NDA
28	Huber, Glenn	10/02/99	10/04/99	0	7.58	NDA	0	NDA
29	Krueger, Bill	10/04/99	10/05/99	11	5.5	1.30E-13	0	NDA
30	Petty, Roger	10/04/99	10/05/99	3	7.66	2.55E-14	0	NDA
31	Krueger, Bill	10/05/99	10/07/99	6	7.25	5.38E-14	0	NDA
32	Petty, Roger	10/05/99	10/07/99	5	7.6	4.28E-14	0	NDA
33	Krueger, Bill	10/06/99	10/07/99	10	9.25	7.03E-14	0	NDA
34	Petty, Roger	10/06/99	10/07/99	11	9.5	7.53E-14	0	NDA
35	Petty, Roger	10/07/99	10/08/99	4	9.5	2.14E-13	0	NDA
36	Krueger, Bill	10/07/99	10/08/99	7	9.7	5.42E-13	0	NDA
37	LL Area Monitor	10/07/99	10/08/99	7	9.5	4.79E-14	4	2.74E-14
38	Krueger, Bill	10/08/99	10/11/99	12	8.8	8.86E-14	2	<MDA
39	Petty, Roger	10/08/99	10/11/99	1	8.8	<MDA	0	NDA
40	LL Area Monitor	10/08/99	10/11/99	21	8.2	1.66E-13	0	NDA
41	LL Area Monitor	10/09/99	10/12/99	0	4.5	NDA	0	NDA
42	Petty, Roger	10/09/99	10/12/99	0	4.5	NDA	1	1.44E-14
43	Krueger, Bill	10/09/99	10/12/99	6	4.5	8.67E-14	0	NDA
44	Petty, Roger	10/11/99	10/12/99	5	9.8	3.32E-14	0	NDA
45	Krueger, Bill	10/11/99	10/12/99	4	3.25	8.00E-14	0	NDA
46	Allore, Jennifer	10/11/99	10/12/99	0	2	NDA	1	<MDA
47	LL Area Monitor	10/11/99	10/12/99	10	9	7.22E-14	0	NDA
48	Petty, Roger	10/12/99	10/15/99	4	9	2.89E-14	2	<MDA
49	Krueger, Bill	10/12/99	10/15/99	2	9	<MDA	1	<MDA
50	LL Area Monitor	10/12/99	10/15/99	2	8.6	<MDA	4	3.02E-14

Prepared By:

**Table 4.2.4
Personal Air Monitoring Results**

Sample ID	Name	Collection Date	Analysis Date	Counts	Sampling Time Hours	Concentration uCi/ml	Recount	Concentration uCi/mL
51	Petty, Roger	10/13/99	10/15/99	4	9.7	2.68E-14	3	2.01E-14
52	Krueger, Bill	10/13/99	10/15/99	8	9.7	5.36E-14	6	4.02E-14
53	Krueger, Bill	10/14/99	10/18/99	1	8.5	<MDA	5	3.82E-14
54	Petty, Roger	10/14/99	10/18/99	4	10	2.60E-14	2	<MDA
55	Krueger, Bill	10/15/99	10/18/99	5	8	4.06E-14	4	3.25E-14
56	Petty, Roger	10/15/99	10/18/99	6	9	4.33E-14	3	2.17E-14
57	Hernandez, Tony	10/15/99	10/18/99	0	1	NDA	1	<MDA
58	Petty, Roger	10/16/99	10/18/99	14	4	2.28E-13	7	1.14E-13
59	Petty, Roger	10/18/99	10/20/99	4	9.75	2.67E-14	3	2.00E-14
60	Petty, Roger	10/19/99	10/20/99	8	9	5.78E-14	0	NDA
61	Krueger, Bill	10/19/99	10/20/99	20	9	1.44E-13	1	<MDA
62	Krueger, Bill	10/18/99	10/20/99	5	8.25	3.94E-14	2	<MDA
63	Krueger, Bill	10/20/99	10/21/99	21	7.5	1.82E-13	4	3.47E-14
64	Petty, Roger	10/20/99	10/21/99	16	8	1.30E-13	0	NDA

Flowrate = 2 lpm

Count Time = 60 minutes

Counts reported are net counts.

N/A = Not available, filter lost.

Counts = Initial analysis

Concentration = Amount of activity of radionuclides in the sampled air.

MDA = Minimum Detectable Activity

NDA = No Detectable Activity

Prepared By:

4.2.5 Total Particulate Air Monitoring

Total particulate air monitoring was performed to measure compliance with applicable regulations. Section 7.1 of the Health and Safety Plan set the personal exposure limit for nuisance dust at 15 mg/m^3 . Other air quality standards are also included on the attached table. None of the results are over these air quality standards.

These samples were collected during the Lake Lindsay excavation from October 7, 1999 to October 12, 1999. The filters were connected to a Gilian Model HFS113A High Flow Sampler. The filters were sent to an outside laboratory for analysis.

Lindsay Light II Site Phase 2 Final Report
 STS Project No. 24418-RR
 January 11, 2000

Table 4.2.5
Total Particulate Air Sampling Results
Lindsay Light II

Location: Lindsay Light

Comments: Total particulate samples collected during excavation of Lake Lindsay

							Published Exposure Limits (mg/m ³)		
Date/ Sample No.	Location	Time	Air Volume	Contaminants	Measured Concentration	Results TWA (mg/m ³)	OSHA PEL	ACGIH TLV	NIOSH REL
10/7/99 1	A-7 Area Sample	6:47am-4:17 pm	1046L	Total particulate	280 µg	0.27	15	10	10
10/8/99 2	A-7 Area Sample	7:15 am-3:27 pm	978L	Total particulate	70 µg	0.072	15	10	10
10/9 & 10/10/99 3	A-7 Area Sample	7:10 am-1:43 pm and 7:00 am-3:52 pm	1840L	Total particulate	180 µg	0.098	15	10	10
10/12/99 4	A-7 Area Sample	7:20 am-3:56 pm	993.7L	Total particulate	310 µg	0.31	15	10	10

EXPLANATIONS AND FOOTNOTES TO TABLE 1

TWA = Time Weighted Average Concentration
 PEL = OSHA Permissible Exposure Limit
 TLV = American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value
 NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit
 mg/m³ = Milligrams per cubic meter

The NIOSH REL is usually the most protective exposure limit and are recommendations made to OSHA.

The OSHA standards are legally enforceable governmental regulations designed to prevent physiological injury or intolerable irritation to workers in industrial settings.

The ACGIH TLV recommendations are designed to provide similar protection to normal healthy workers in industrial settings, but are not legally enforceable. However, the TLVs are reviewed and updated annually.

4.2.6 Thermoluminescent Dosimetry

The dosimetry program on the MCL River East site consisted of Landaur Whole Body TLD-700s. These badges were assigned to individuals that entered exclusion zones.

The Landauer WB TLD-700 contains 3 LiF chips that measure for different types of radiation (alpha, beta, gamma). "M" on the attached Table 4.2.6 indicates a whole body dose of less than 10 mrem. All dosimetry participants received minimal doses. The annual occupational whole body limit is 5,000 mrem.

Table 4.2.6

Dosimetry Results For the River East Project

Name*	Participant Number	Dose Equivalent (mrem) 04/15-07/14/99	Dose Equivalent (mrem) 07/15-10/14/99	Dose Equivalent (mrem) 10/15-10/30/99	Total Accumulated Dose Equivalent (mrem)
Loughlin, Brian	00037	M	M	M	M
Guerrier, Dumas	00043	M	M	M	M
Propeck, James	00044	M	M	M	M
Hernandez, Luis	00045	M	M	M	M
Williams, Jamie	00046	M	M	M	M
Hampson, Edie	00047	M	M	M	M

* - All participants in dosimetry program at the River East site were badged with a Landauer Whole Body TLD-700. These badges contain three separate TLD chips to allow dissemination for different types of radiation. M indicated that a dose of less than 10 mrem was obtained.

S T S C O N S U L T A N T S , L T D .



FIGURES

FIGURES

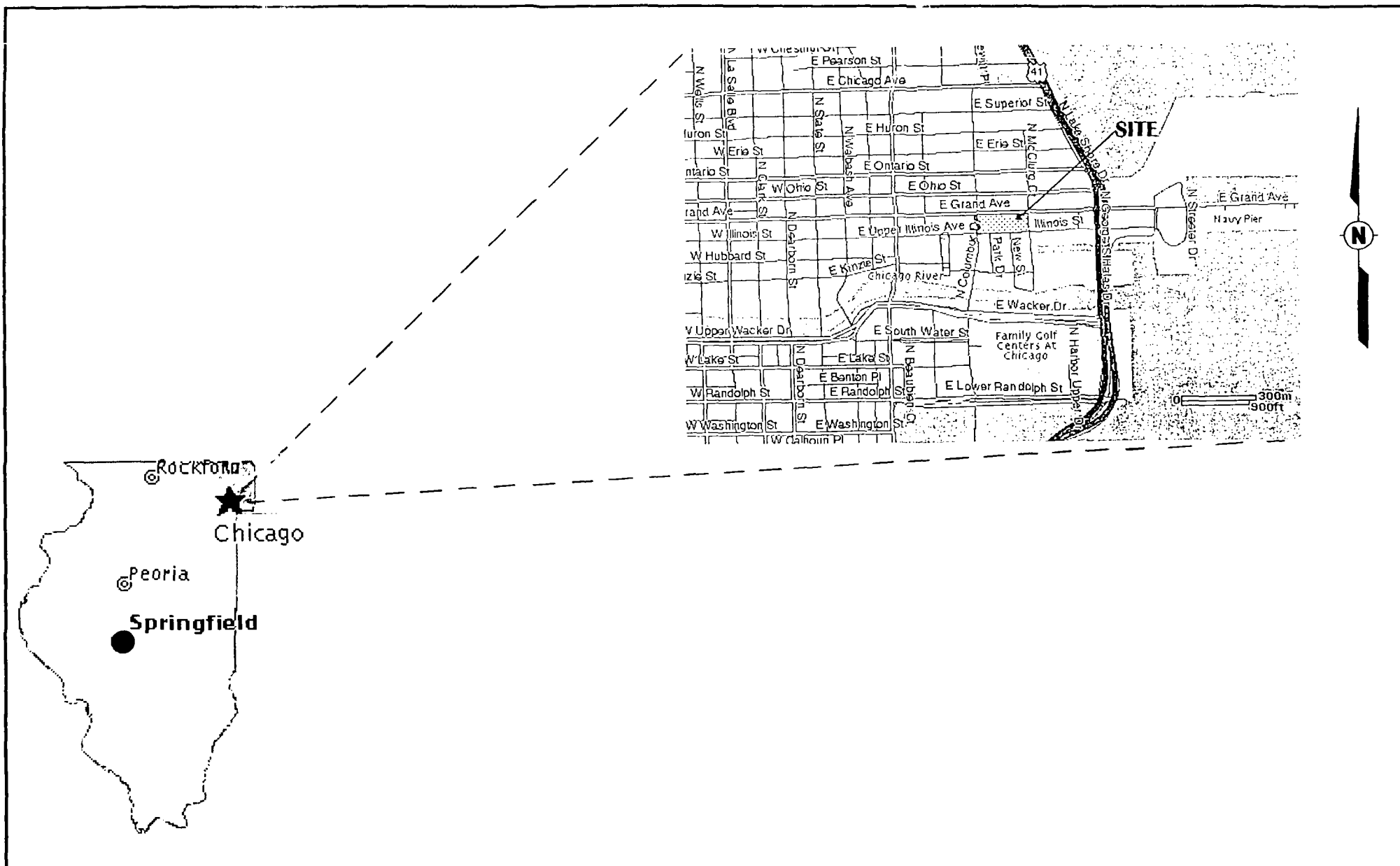

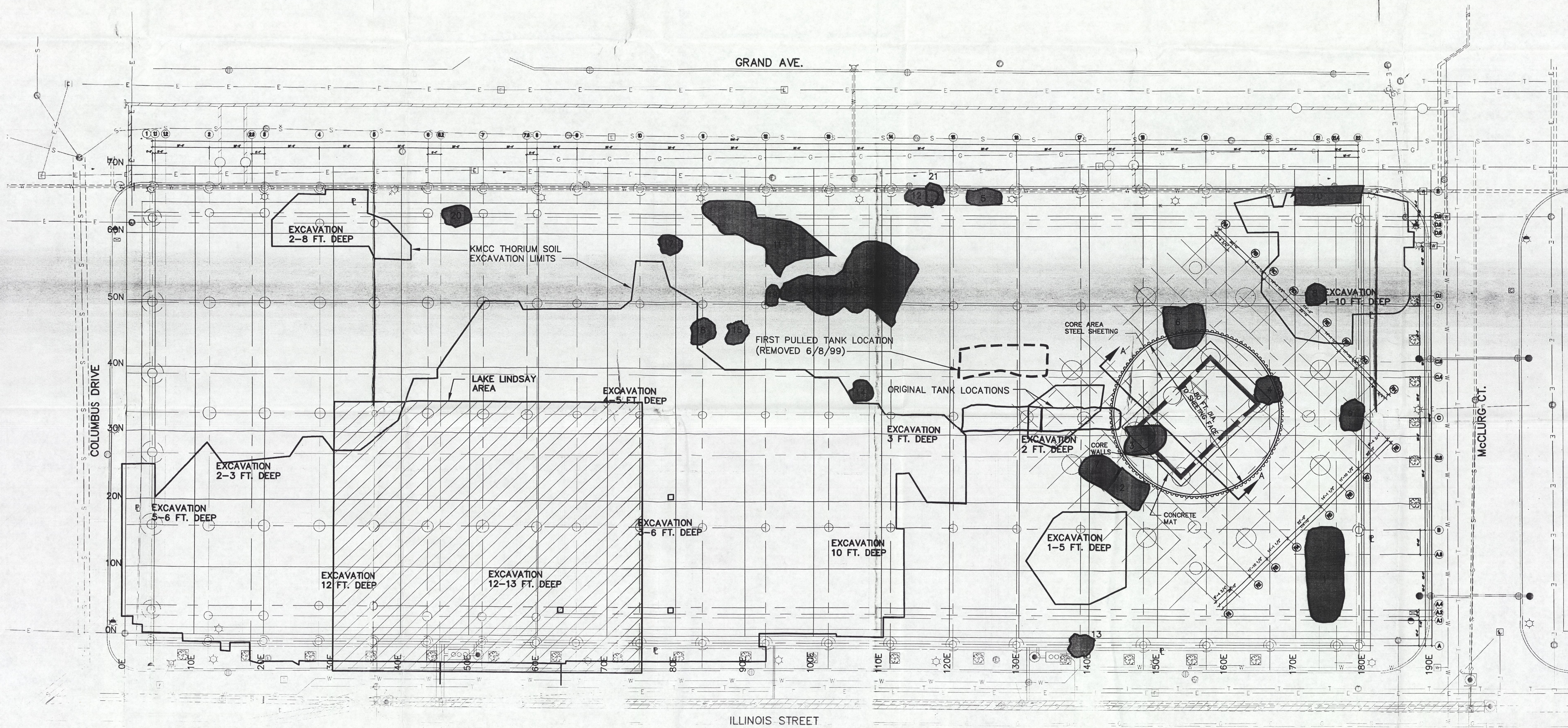


FIGURE NO. 1.1	SCALE NTS	SIS PROJECT FILE 24418-RR	SIS PROJECT NO. 24418-RR	 STS Consultants Ltd. Consulting Engineers	SITE LOCATION MAP RIVER EAST CENTER MIXED USE DEVELOPMENT 300 EAST ILLINOIS STREET CHICAGO, ILLINOIS		DRAWN BY KKB CHECKED BY STN APPROVED BY RGB CADFILE	DATE 1-7-00 DATE 1-7-00 DATE 1-7-00
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GRAND AVE.

ILLINOIS STREET

McCLURG Ct.

RIVER EAST/MCL REMEDIATION
EXCLUSION ZONE SUMMARY

AREA #	DATE EXISTED (1999)	DATE SAMPLED (1999)	DATE RELEASED (1999)	SAMPLE DESIGNATION
1	6/2	6/3	6/8	B-21N, B-21S
2	6/2	6/3	6/9	B-18
3	6/7	6/7	6/9	B-6-17
4	6/4	6/7	6/9	C-2-20
5	6/4	6/7	6/9	E-15.5
6	6/4	6/7	6/9	C-8-18.5
7	6/2	6/8	6/11	B-8-17.5
8	6/5	6/8	6/11	D-21.5
9	6/3	6/8	6/11	C-22
10	6/3	6/8	6/11	E-22
11	6/4-6/5	6/9	6/11	D-7-11.5, D-7-12.5
12	6/4	6/9	6/11	E-14.5
13	6/7	6/11	6/15	A-2-17
14	6/8	6/11	6/15	C-2-13.5
15	5/10	6/11	6/16	C-8-11
16	6/8-6/10	6/11	6/15	D-12.5, D-13.0, D-2-14
17	6/10	6/11	6/15	D-5-10.5
18	6/11	6/14	6/15	C-8-11.5
19	6/15	6/16	6/16	D-12
20	6/23	6/24	6/24	D-8-6.5
21	6/28	6/29	6/29	E-14.75

LEGEND:

- KMCC THORIUM SOIL EXCAVATION LIMITS
- KMCC APPROXIMATE DEPTH OF EXCAVATION
- RIVER EAST/MCL REMEDIATION EXCLUSION ZONE AND IDENTIFICATION NUMBER
- SITE STATIONS IN METERS (FORMER COORDINATE SYSTEM)
- COLUMN NUMBER DESIGNATION (SITE COORDINATE SYSTEM CURRENT REMEDIATION)
- LAKE LINDSAY AREA

SCALE IN FEET
20' 0' 20'

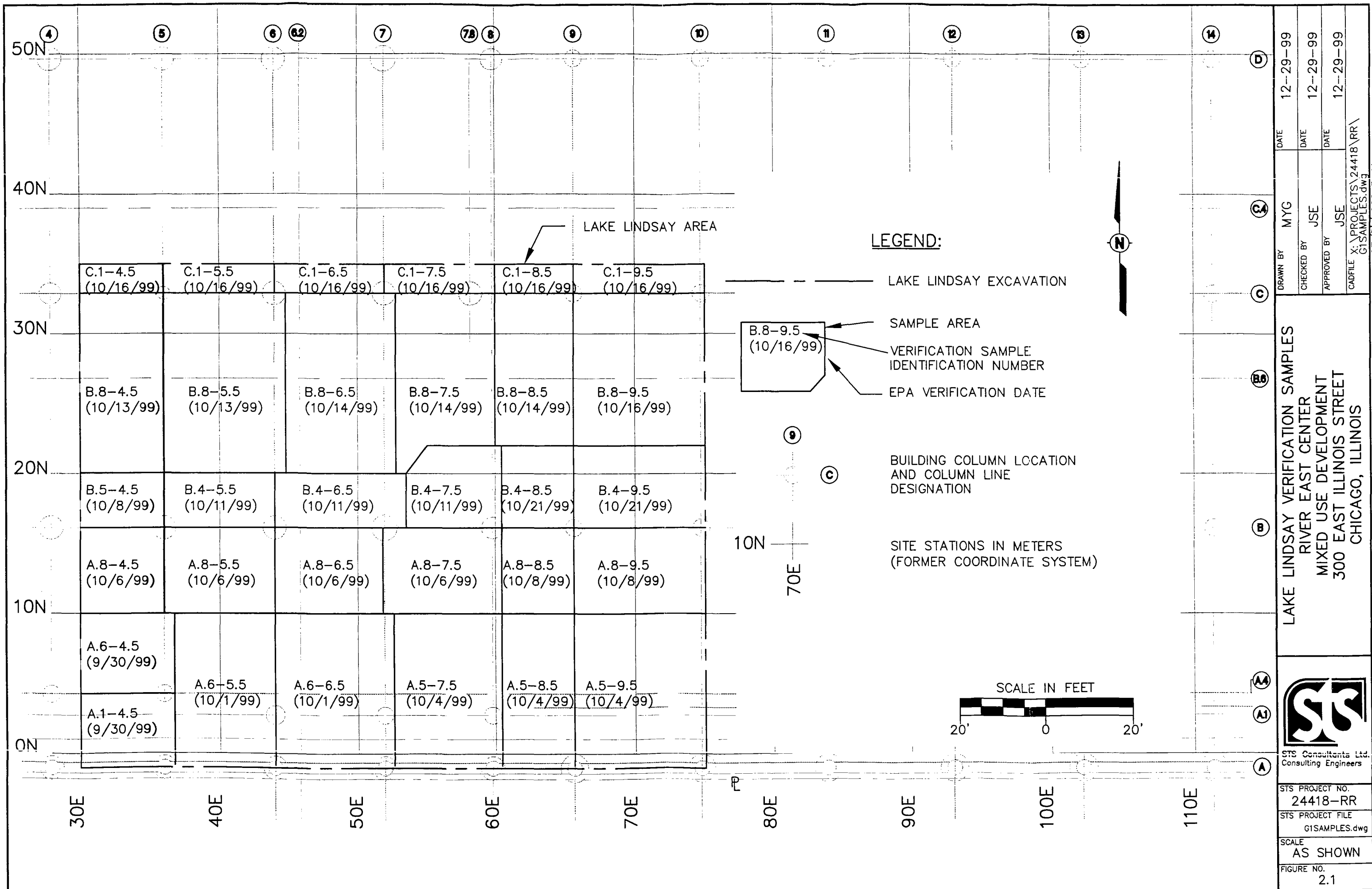
EXCLUSION ZONES
RIVER EAST CENTER
MILWAUKEE STREET
300 EAST ILLINOIS STREET
CHICAGO, ILLINOIS

RIVER EAST
CENTER

STS
STS Consultants Ltd.
Consulting Engineers

STS PROJECT NUMBER
24418-RR
STS PROJECT FILE
G1conetm.DWG
SCALE
AS SHOWN
SHEET NUMBER
1.2

DRAWN BY	DATE	12-29-99
MCV		
CHECKED BY	DATE	12-29-99
JOE		
APPROVED BY	DATE	12-29-99
SAE		
CABLE	DATE	12-29-99
REVISION	DESCRIPTION	DATE
6/7/99	24418 (R)	
6/7/99	1.1	



S T S C O N S U L T A N T S , L T D .



ATTACHMENTS

ATTACHMENTS

ATTACHMENT A

Work Plan

(separate volume)

ATTACHMENT B

Verification Release Forms

NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY FORMS

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: A2-17Date of Verification Survey: 6-11-99

Time of Verification Survey _____ am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eddie Seals-Hampton Date 6-16-99
Eddie Seals-Hampton (Print Name)
Project Coordinator (Print Title)

For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/15/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/16/99
FREDRICK A. MICKE (Print Name)
OSC - USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: B 18Date of Verification Survey: 6-3-99Time of Verification Survey 10:30 a.m. am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Scala-Hampson Date 6-9-99
Edie Scala-Hampson (Print Name)
STS (Print Title)

~~For Kerr-McGee Chemical Corporation~~

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/9/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/9/99
FREDRICK A. MICKE (Print Name)
OSC, US EPA (Print Title)

For U.S. EPA Region V

OPTIONAL FORM 88 (7-90)

FAX TRANSMITTAL

of pages 1

To <u>Steve Michels</u>	From <u>Fred Micke</u>
Agency <u>STS</u>	Phone # <u>(312) 886-5123</u>
Fax # <u>(312) 755-2750</u>	Fax # <u>353-9176</u>

NSN 7546-01-311-7368

5095 101

GENERAL SERVICES ADMINISTRATION

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: B21N

Date of Verification Survey: 6-3-99

Time of Verification Survey 12:50 p.m. am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Scale-Hampson Date 6-9-99

Edie Scale-Hampson (Print Name)

(Print Title)

For ^{STS}~~Kerr-McGee~~ Chemical Corporation

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/9/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/9/99

FREDRICK A. MICKE (Print Name)

OSC (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: Bals

Date of Verification Survey: 6-3-99

Time of Verification Survey 1:15 p.m. am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eddie Seale-Hampton Date 6-9-99

Eddie Seale-Hampton (Print Name)

(Print Title)

STS
For ~~Kerr-McGee~~ Chemical Corporation

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/9/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/9/99

FREDRICK A. MICKE (Print Name)

OSC (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: B.6-17

Date of Verification Survey: 6-7-99

Time of Verification Survey _____ am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eddie Scala-Hampson Date 6-11-99

Eddie Scala-Hampson (Print Name)

(Print Title)

For ^{STS} ~~Kerr-McGee~~ Chemical Corporation

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/10/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/11/99

FREDRICK A. MICKE (Print Name)

OSC, USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: B-8-17.5

Date of Verification Survey: 6-8-99

Time of Verification Survey 6/8/99 11:35 ampm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Scala-Hungern Date 6-15-99

Edie Scala-Hungern (Print Name)

Project Coordinator (Print Title)

~~For Kerr-McGee Chemical Corporation~~ STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/14/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/15/99

FREDRICK A. MICKE (Print Name)

OSC-USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: C-22

Date of Verification Survey: 6-8-99

Time of Verification Survey 6/8/99 11:15 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Sueb-Hompson Date 6-15-99

Edie Sueb-Hompson (Print Name)

Project Coordinator (Print Title)

~~For Kerr-McGee Chemical Corporation~~ STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/14/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/15/99

FREDRICK A. MICKE (Print Name)

OSC - USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: C-2-13.5

Date of Verification Survey: 6-11-99

Time of Verification Survey _____ am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Scale-Hampson Date 6-15-99

Edie Scale-Hampson (Print Name)

Project Coordinator (Print Title)

For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/15/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/15/99

FREDRICK A. MICKE (Print Name)

OSC - USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: C-2-20

Date of Verification Survey: 6-7-99

Time of Verification Survey _____ am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edith J. deHoggen Date 6-11-99
Edie Scala-Hoggen (Print Name)

(Print Title)

For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/10/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/11/99
FREDRICK A. MICKE (Print Name)
OSC, USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: C.8-11Date of Verification Survey: 6-14-99

Time of Verification Survey _____ am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eddie Scale-Hampton Date 6-16-99
Eddie Scale-Hampton (Print Name)
Project Coordinator (Print Title)

For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/16/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/16/99
FREDRICK A. MICKE (Print Name)
OSC - USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: C. 8 - 11.5

Date of Verification Survey: 6-11-99

Time of Verification Survey _____ am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eddie Seals-Hampton Date 6-15-99
Eddie Seals-Hampton (Print Name)
Project Coordinator (Print Title)

For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/15/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/15/99
FREDRICK A. MICKE (Print Name)
OSC - USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: C-8-18.5

Date of Verification Survey: 6-7-99

Time of Verification Survey _____ am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Scala-Hompson Date 6-11-99

Edie Scala-Hompson (Print Name)

(Print Title)

For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/10/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/11/99

FREDRICK A. MICKE (Print Name)

OSC, USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: D-12

Date of Verification Survey: 6-16

Time of Verification Survey 9:36 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Seal-Hansen Date 6-18-99
Edie Seal-Hansen (Print Name)
Project Coordinator (Print Title)

For Ken-McGee Chemical Corporation
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/16/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/18/99
FREDRICK A. MICKE (Print Name)
OSC - USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: D-12.5Date of Verification Survey: 6-11-99

Time of Verification Survey _____ am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eddie Seals-Hampton Date 6-15-99Eddie Seals-Hampton (Print Name)Project Coordinator (Print Title)For ~~Kon-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/15/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/15/99FREDRICK A. MICKE (Print Name)OSC - USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: D-13

Date of Verification Survey: 6-11-99

Time of Verification Survey _____ am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eddie Scala-Hampton Date 6-15
Eddie Scala-Hampton (Print Name)
Project Coordinator (Print Title)

For ~~Kem-McGee Chemical Corporation~~
~~STS~~

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/15/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/15/99
FREDRICK A. MICKE (Print Name)
OSC-USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: 0-21.5

Date of Verification Survey: 6-8-99

Time of Verification Survey 6/8/99 10:45 (am)

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Scale-Henry Date 6-8-99

Edie Scale-Henry (Print Name)

Project Coordinator (Print Title)

For Kerr-McGee Chemical Corporation STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/14/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/15/99

FREDRICK A. MICKE (Print Name)

OSC - USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: D-2-14Date of Verification Survey: 6-11-99

Time of Verification Survey _____ am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eddie Scale-Hampson Date 6-15-99
Eddie Scale-Hampson (Print Name)
Project Coordinator (Print Title)

For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/15/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/15/99
FREDRICK A. MICKE (Print Name)
OSC - USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: D, 5 - 10.5Date of Verification Survey: 6-15-99 ^{5:11}

Time of Verification Survey _____ am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Scala-Hampson Date 6-15-99Edie Scala-Hampson (Print Name)Project Coordinator (Print Title)For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/15/99. The results of this survey indicate that the verification criteria as contained in the UAD, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/15/99FREDRICK A. MICKE (Print Name)OSC - USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: D-7-11.5

Date of Verification Survey: 6-9-99

Time of Verification Survey 6/9/99 12:10 am pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Scala-Hampson Date 6-15-99

Edie Scala-Hampson (Print Name)

Project Coordinator (Print Title)

For Kerr-McGee Chemical Corporation STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/14/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/15/99

FREDRICK A. MICKE (Print Name)

OSC - USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: D-2-12.5

Date of Verification Survey: 6-9-99

Time of Verification Survey 6/9/99 12:40 am pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eric S. Hampson Date 6-15-99
Eric S. Hampson (Print Name)
Project Coordinator (Print Title)

For Kerr-McGee Chemical Corporation STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/14/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/15/99
FREDRICK A. MICKE (Print Name)
DSC-USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: D.8-6.5

Date of Verification Survey: 6/24/99

Time of Verification Survey 11:45 ampm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Steven S. Michels Date 6/24/99

STEVEN S. MICHEL (Print Name)

PROJECT MANAGER (Print Title)

For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/24/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/24/99

FREDRICK A. MICKE (Print Name)

OSC - USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: E-14.5

Date of Verification Survey: 6-9-99

Time of Verification Survey 6/9/99 11:20 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eddie Sala-Huffman Date 6-15-99
Eddie Sala-Huffman (Print Name)
Project Coordinator (Print Title)

For Ken McGee Chemical Corporation — STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/14/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/15/99
FREDRICK A. MICKE (Print Name)
OSC-USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: E-14.75Date of Verification Survey: 6/29/99Time of Verification Survey 9:15 am pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

 Date 6/29/99STEVEN S. MICHELS (Print Name)SENIOR PROJECT ENGINEER/MANAGER (Print Title)

For ~~Kerr-McGee~~ Chemical Corporation
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/29/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

 Date 6/29/99FREDRICK A. MICKÉ (Print Name)OSC - USEPA (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: E-15.5

Date of Verification Survey: 6-7-99

Time of Verification Survey _____ am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Scale-Hungem Date 6-11-99
Edie Scale-Hungem (Print Name)

(Print Title)

For ~~Kerr-McGee~~ Chemical Corporation
JTS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/10/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/11/99
FREDRICK A. MICKE (Print Name)
OSC, USEPA (Print Title)

For U.S. EPA Region V

FORM 2 1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: E-22

Date of Verification Survey: 6-8

Time of Verification Survey 6/8/99 10:20 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Ede Seals-Hampson Date 6-15-99

Ede Seals-Hampson (Print Name)

Project Coordinator (Print Title)

~~For Kern-McGee Chemical Corporation~~ STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 6/14/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 6/15/99

FREDRICK A. MICKE (Print Name)

OSC - U.S. EPA (Print Title)

For U.S. EPA Region V

LAKE LINDSAY SITE

Notification of Successful Verification Survey Forms

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: A1-4.5 Lake LindenDate of Verification Survey: 9-30-99Time of Verification Survey 3:30 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Scala-Hampson Date 9-30-99Edie Scala-Hampson (Print Name)Project Coordinator (Print Title)For ~~Kennel~~ McGee Chemical Corporation
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/1/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Mücke Date 10/4/99FREDRICK A. MUCKE (Print Name)ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: A-5-7.5

Date of Verification Survey: 10-4-99

Time of Verification Survey 12:30 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Scala-Hayden Date 10-4-99

Edie Scala-Hayden (Print Name)

Project Coordinator (Print Title)

For ~~Kem-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/4/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 10/4/99

FREDRICK A. MICKE (Print Name)

ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: A-5-8.5Date of Verification Survey: 10-4-99Time of Verification Survey 1:00 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Seals-Hampton Date 10-4-99Edie Seals-Hampton (Print Name)Project Coordinator (Print Title)For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/4/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 10/4/99FREDRICK A. MICKE (Print Name)ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: 4.5-9.5

Date of Verification Survey: 10-4-99

Time of Verification Survey 3:00 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Seck-Hampson Date 10-4-99
Edie Seck-Hampson (Print Name)
Project Coordinator (Print Title)

For ~~Ken McGee~~ Chemical Corporation
 STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/4/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Mucke Date 10/4/99
FREDRICK A. MUCKE (Print Name)
ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Verification Survey Procedures 223-1

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL

of pages = 3

To	<u>Edie Hampson</u>	From	<u>Fred Mucke</u>
Dept./Agency	<u>STS</u>	Phone #	<u>312-886-5123</u>
Fax #	<u>312-494-9768</u>	Fax #	<u>312-353-9176</u>

NSN 7540-01-317-7304

5099-10

GENERAL SERVICES ADMINISTRATION

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: A.6-4.5 Lake LindsayDate of Verification Survey: 9-30-99Time of Verification Survey 3:30 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Scala-Hampson Date 9-30-99Edie Scala-Hampson (Print Name)Project Coordinator (Print Title)

For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/1/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 10/4/99FREDRICK A. MICKE (Print Name)ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: A-6-5.5 Lake Lindsey

Date of Verification Survey: 10-1-99

Time of Verification Survey 4:00 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Seda-Hampson Date 10-1-99
Edie Seda-Hampson (Print Name)
Project Coordinator (Print Title)

For ~~Kem-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/4/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 10/4/99
FREDRICK A. MICKE (Print Name)
ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: A-6-B-5 Lake LinderoDate of Verification Survey: 10-1-99Time of Verification Survey 4:00 am/pm (pm)

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eric S. Hays Date 10-1-99
Eric S. Hays (Print Name)
Project Coordinator (Print Title)

For ~~Kennecott~~ Chemical Corporation
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/4/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 10/4/99
FREDRICK A. MICKE (Print Name)
ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

**FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY**

Area Identification: A.8-4.5

Date of Verification Survey: 10-6-99

Time of Verification Survey 1:45 p.m. ampm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eddie Scale-Hampton Date 10-6-99
Eddie Scale Hampton (Print Name)
Project Coordinator (Print Title)

For ~~Ken McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/7/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 10/7/99
FREDRICK A. MICKE (Print Name)
ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

FAX TRANSMITTAL

of pages = 234

To <u>Eddie Hampton</u>	From <u>Fred Micke</u>
Dept./Agency <u>STS</u>	Phone # <u>312-886-5123</u>
Fax # <u>312-494-9768</u>	Cell # <u>312-353-9176</u>

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: A. 8-55Date of Verification Survey: 10-6Time of Verification Survey 8:00 p.m. am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Scala-Hampton Date 10-6-99
Edie Scala-Hampton (Print Name)
Project Coordinator (Print Title)

For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/7/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 10/7/99
FREDRICK A. MICKE (Print Name)
ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: A. 8-6.5

Date of Verification Survey: 10-6-99

Time of Verification Survey 2:15 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Scale-Hampton Date _____
Edie Scale-Hampton (Print Name)
Project Coordinator (Print Title)

For ~~Kem-McGee~~ Chemical Corporation
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/7/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 10/7/99
FREDRICK A. MICKE (Print Name)
ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: A. 8-7.5Date of Verification Survey: 10-6-99Time of Verification Survey 2:30 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eddie Seals-Hampton Date 10-6-99
Eddie Seals-Hampton (Print Name)
Project Coordinator (Print Title)

For ~~Kem-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/7/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 10/7/99
FREDRICK A. MICKE (Print Name)
ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: A.8-8.5

Date of Verification Survey: 10-8-99

Time of Verification Survey 9:00 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Ach-Hampton Date 10-8-99
Edie Ach-Hampton (Print Name)
Project Coordinator (Print Title)

For ~~Kem-McCoe Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/8/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 10/8/99
FREDRICK A. MICKE (Print Name)
ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

FAX TRANSMITTAL

of pages 3

To <u>Edie Hampton</u>	From <u>Fred Micke</u>
Govt Agency <u>STS</u>	Phone # <u>312-886-5123</u>
Fax # <u>312-494-9768</u>	Fax # <u>312-353-9176</u>

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: A.8-9.5Date of Verification Survey: 10-8Time of Verification Survey 9:25 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Ann Hoffman Date 10-8
Edie Ann Hoffman (Print Name)
Project Coordinator (Print Title)

For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/8/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 10/8/99
FREDRICK A. MICKE (Print Name)
ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: B.4-5.5

Date of Verification Survey: 10-11-99

Time of Verification Survey 11:35 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Loh-Hampson Date 10-11-99
Edie Loh-Hampson (Print Name)
Project Coordinator (Print Title)

For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/11/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 10/11/99
FREDRICK A. MICKE (Print Name)
ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: B.4-6.5

Date of Verification Survey: 10-11-99

Time of Verification Survey 11:50 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Scala-Hampson Date 10-11-99
Edie Scala-Hampson (Print Name)
Project Coordinator (Print Title)

For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/11/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 10/11/99
FREDRICK A. MICKE (Print Name)
ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

Nutranl Sample Analysis
RSSI

Sample Number (Grid Point)	Date Collected	Date Analyzed	Ra-228 (pCi/g)	Ra-226 (pCi/g)	Total Radium (pCi/g)
S166 B 4-5.5	10/11/1999	10/11/1999	0.75 ± 0.55	1.88 ± 0.93	2.63
S167 B 4-5.5	10/11/1999	10/11/1999	0.80 ± 0.40	1.82 ± 0.69	2.62
S168 B 4-5.5	10/11/1999	10/11/1999	1.37 ± 0.51	1.33 ± 0.85	2.70
S169 B 4-6.5	10/11/1999	10/11/1999	0.20 ± 0.51	2.10 ± 0.91	2.30
S170 B 4-6.5	10/11/1999	10/11/1999	1.01 ± 0.47	1.15 ± 0.78	2.16
S171 B 4-6.5	10/11/1999	10/11/1999	0.98 ± 0.43	1.29 ± 0.72	2.27

Sample Analyzed By: Jennifer Allore
Jennifer Allore

Date: 10/11/99

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: B-4-7.5Date of Verification Survey: 10/15/99Time of Verification Survey 4:00 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

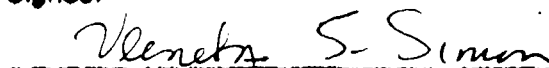
Date 10/15/99STEVEN S. MICHELS (Print Name)PROJECT MANAGER (Print Title)

For Ken McGee Chemical Corporation
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/16/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Date 10/16/99VERNETTA J. SIMON (Print Name)On-Scene Coordinator (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: B.4-8.5

Date of Verification Survey: 10/21/99

Time of Verification Survey 2:00 am/pm (pm)

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed: Eric S. Pittman Date 10/21/99
ERIC S. PITTMAN (Print Name)
LEAD HEALTH PHYSICIST (Print Title)

For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/21/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation

Signed: Verneta S. Simon Date 10/21/99
VERNETA S. SIMON (Print Name)
On-Scene Coordinator (Print Title)


For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: B.4-9.5
Date of Verification Survey: 10/21/99
Time of Verification Survey: 11:00 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

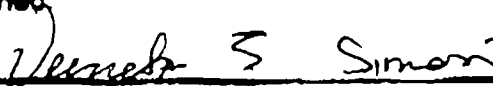
Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:  Date 10/21/99
ERIC S. PITTMAN (Print Name)
LEAD HEALTH PHYSICIST (Print Title)

For ~~Kem-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/21/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:  Date 10/21/99
VERNETA J. SIMON (Print Name)
On-Scene Coordinator (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: B-5-7.5Date of Verification Survey: 10-8Time of Verification Survey 10:15 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Edie Seclark Hampton Date 10-8Edie Seclark Hampton (Print Name)Project Coordinator (Print Title)For ~~Kerr-McGee Chemical Corporation~~STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/8/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 10/8/99FREDRICK A. MICKE (Print Name)ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: B.8-4.5 LINDSAY Light IIDate of Verification Survey: 10/13/99Time of Verification Survey 9:45 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eric S. Pittman For Edie Hampson Date 10/13/99
ERIC S. PITTMAN (Print Name)
LEAD HEALTH PHYSICIST (Print Title)

For ~~Kerr-McGee Chemical Corporation~~
~~STS~~

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/13/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Mücke Date 10/13/99
FREDRICK A. MUCKE (Print Name)
ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

FAX TRANSMITTAL

of pages 2

To: <u>Edie Hampson</u>	From: <u>Fred Mücke</u>
Designation: <u>STS</u>	Phone: <u>(312) 886-5123</u>
Fax: <u>(312) 494-9768</u>	Fax: <u>353-9176</u>

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: B.8-5.5Date of Verification Survey: 10/13/99Time of Verification Survey 10:20 am

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eric S. Pittman For Eric Pittman Date 10/13/99
ERIC S. PITTMAN (Print Name)
LEAD HEALTH PHYSICIST (Print Title)

For Kern McGee Chemical Corporation
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/13/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. Micke Date 10/13/99
FREDRICK A. MICKE (Print Name)
ON-SCENE COORDINATOR (Print Title)


For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: B.8-6.5
Date of Verification Survey: 10/14/99
Time of Verification Survey 10:30 (am/pm)

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.


Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:  Date 10/14/99
ERIC S. PITMAN (Print Name)
LEAD HP (Print Title)

For ~~Kem-McGee Chemical Corporation~~
STJ

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/14/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:  Date 10/14/99
FREDRICK A. MICKE (Print Name)
ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

FORM 223-1

NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEY

Area Identification: B.8-7.5Date of Verification Survey: 10/14/99Time of Verification Survey 11:00 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eric S. Pittman Date 10/14/99
ERIC S. PITTMAN (Print Name)
LEAD H.P. (Print Title)

For ~~Kor~~ McGee Chemical Corporation
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/14/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation

Signed:

Fredrick A. Micke Date 10/14/99
FREDRICK A. MICKE (Print Name)
ON-SCENE COORDINATOR (Print Title)

For U.S. EPA Region V

OPTIONAL FORM 60 (7-90)

FAX TRANSMITTAL

of pages 23

To <u>Edie Thompson</u>	From <u>Fred Micke</u>
Dist. Agency <u>STS</u>	Phone <u>(312) 886-5123</u>
Fax <u>(312) 494-9768</u>	Fax # <u>353-9176</u>

OCT-14-1999 11:37

STS Consultants, Ltd.

847 279 2535 P.01/01

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: B.8-8.5Date of Verification Survey: 10/14/99Time of Verification Survey 11:45 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Eric S. PittmanDate 10/14/99ERIC S. PITTMAN

(Print Name)

LEAD H.P.

(Print Title)

For Kerr-McGee Chemical Corporation
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/14/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation.

Signed:

Fredrick A. MickeDate 10/14/99FREDRICK A. MICKE

(Print Name)

ON-SCENE COORDINATOR

(Print Title)

For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: B.8-9.5Date of Verification Survey: 10/15/99Time of Verification Survey 2:00 am/pm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:

Date 10/15/99STEVEN S. MICHELLS

(Print Name)

PROJECT MANAGER

(Print Title)

For ~~Kon-McGee Chemical Corporation~~
~~STS~~

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/16/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation

Signed:

Date 10/16/99VERNETTA J. SIMON

(Print Name)

On-Scene Coordinator

(Print Title)


For U.S. EPA Region V

FORM 223-1
NOTIFICATION OF SUCCESSFUL VERIFICATION SURVEYArea Identification: C.1-4.5, C.1-5.5, C.1-6.5, C.1-7.5, C.1-8.5, C.1-9.5Date of Verification Survey: 10/16/99Time of Verification Survey 11:30 ampm

The above-described excavation was surveyed at the time and date indicated above. The survey indicated that all soils have been removed as required by the Site Removal Action Criteria.

Documents pertaining to this survey are attached for review and approval by the U.S. EPA.

Signed:


 Date 10/16/99
STEVEN S. MICHELS (Print Name)
PROJECT MANAGER (Print Title)

For ~~Kerr-McGee Chemical Corporation~~
STS

The attached Verification Survey documents were reviewed by U.S. EPA, Region V on 10/16/99. The results of this survey indicate that the verification criteria as contained in the UAO, have been met.

Authorization is hereby granted to commence backfill and restoration work at this excavation

Signed:

 Date 10/16/99
Veeneta J Simon (Print Name)
On-Scene Coordinator (Print Title)

For U.S. EPA Region V

ATTACHMENT C

Highway Authority Agreement

No P.I.N. applicable
Document affects public way.

99924673

RIGHT-OF-WAY AGREEMENT

This Right-of-Way Agreement ("Agreement") is entered into this 27th day of Sept., 1999 by and among River East, L.L.C. ("River East") and Kerr-McGee Chemical L.L.C. ("Kerr-McGee"), together referred to herein as the Obligors ("Obligors"), and the City of Chicago ("City"), as follows:

1. This Agreement is not binding on the City until it is executed by a duly authorized representative of the City. Prior to execution, this Agreement constitutes an offer by the Obligors. The duly authorized representatives of the Obligors have signed this Agreement, and this Agreement is binding upon them and their successors by merger or reorganization, upon execution by the City.
2. The Obligors stipulate:
 - a. The Site is located at 316 E. Illinois Street, Chicago, Illinois ("the Site"). The Site is and has been for multiple decades, used as an asphalt-paved parking lot. The Site is bounded by Grand Avenue, McClurg Court, Illinois Street and Columbus Drive.
 - b. On June 3, 1993, the United States Environmental Protection Agency ("USEPA") and the Illinois Department of Nuclear Safety ("IDNS") conducted a joint investigation at the Site and verified the presence of radioactivity below the asphalt surface of the Site at levels above natural background. USEPA determined that the use of the Site as a parking lot posed a negligible risk to the public.
 - c. A historical search determined that in the 1920s and 1930s a company known as the Lindsay Light Company leased the Site for the processing of thorium ores. Lindsay Light is a predecessor of Kerr-McGee. An ingredient in gas mantel manufacturing is thorium extracted from sand and formed into a solution into which mantels were dipped during the manufacturing process. It is believed that Section 11(e) (2) material, 42 U.S.C. §2014(e)(2) from this processing process is found at and around the Site ("Thorium Residuals").
 - d. On January 27, 1994, the Chicago Dock & Canal Trust ("Chicago Dock") (a predecessor to River East), entered into an Administrative Order by Consent ("AOC") with USEPA to investigate and study the extent of Thorium Residuals at

the Site. The study was completed in May, 1994. A final report concerning the extent of contamination was delivered to USEPA on October 17, 1995, and the study was approved by USEPA on March 13, 1996. The final report concluded, inter alia, that there were twelve subsurface areas at the Site which exhibited elevated gamma radiation levels. The AOC is Attachment B.

- e. On June 6, 1996, the USEPA issued a Unilateral Administrative Order ("UAO") to Chicago Dock and Kerr-McGee directing that a removal action be conducted at the Site pursuant to Section 106(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. §9606(a). The UAO established criteria (the "Cleanup Criteria") for Thorium Residuals of 7.1 picoCuries per gram total radium – 5 picoCuries per gram total radium above background. The UAO is attached as Attachment C.
 - f. Pursuant to the UAO and with approval of USEPA, Chicago Dock and Kerr-McGee conducted and completed a removal action at the Site. This remediation took several months during CY1996 and 1997 and involved the removal and disposal of soils from the Site.
 - g. During the removal action, testing along Illinois Street and Columbus Drive revealed deposits of Thorium Residuals which could not be readily excavated. Information regarding the known location of this contamination was provided to the City during a meeting on June 26, 1997, and in subsequent correspondence dated July 14, 1997. Attachment D depicts the portions of Grand Avenue, Illinois Street, McClurg Court and Columbus Drive rights-of-way adjacent to the Site that are the subject of this Agreement ("designated rights-of-way"). The impacted areas of the designated rights-of-way adjacent to the Site where Thorium Residuals are known to be located ("impacted rights-of-way") are described on Attachment E. If subsequent sampling and analysis indicates the presence of contaminants associated with Thorium Residuals beneath the designated rights-of-way, then those areas shall be subject to and covered by this Agreement.
 - h. Attached as Attachment E is a site map showing the known areas of Thorium Residuals in the impacted rights-of-way, and the relative concentration of the Thorium Residuals governed by the UAO.
- 3. The City stipulates that it holds the designated rights-of-way adjacent to the Site in trust for the public and has jurisdiction over the designated rights-of-way.
 - 4. The parties stipulate that:
 - a. This Agreement is intended to meet the requirements of the United States Environmental Protection Agency regarding Thorium Residuals.
 - b. This Agreement shall run with the land constituting the designated rights-of-way and shall be recorded by the Obligor at their expense with the Cook County

Recorder of Deeds on the property described in Attachment D (the designated rights-of-way). Within thirty (30) days of such recording with the Cook County Recorder of Deeds, the Obligors shall provide the City a copy of the Agreement that has been stamped by the Cook County Recorder of Deeds to indicate that it has been recorded with that office. No filing or notice will be referenced against the Site.

- c. This Agreement shall be null and void should the United States Environmental Protection Agency not approve it.
5. The City agrees that it will limit access to soil as described herein under portions of the impacted rights-of way described in Attachment E and in any supplemental exhibits as provided in ¶2(g) that exceed USEPA Cleanup Criteria, as provided in Code Section 10-20-100, et.seq. subject to the following conditions:
- a. Where the pavement and sidewalk in the impacted rights-of-way are to be considered engineered barriers to gamma radiation emanating from Thorium Residuals, the Obligors agree to reimburse the City for maintenance activities requested by the Obligors. The City does not agree to maintain the designated rights-of-way, nor does it guarantee that the designated rights-of-way will continue as a roadway or sidewalk, or that the impacted rights-of-way will always be maintained as an engineered barrier.
 - b. This Agreement does not in any way limit the City's authority to construct, reconstruct, repair or maintain and operate the designated rights-of-way upon the property or other portions of the designated rights-of-way subsequently identified as containing contaminants associated with Thorium Residuals, or to allow others to use the designated rights-of-way. To that extent, the City reserves the right to identify, investigate, and remove soil contaminated with Thorium Residuals above the Cleanup Criteria from the impacted rights-of-way or from other portions of the designated rights-of-way adjacent to the Site subsequently identified as containing contaminants associated with Thorium Residuals and to dispose of them in accordance with applicable environmental regulations so as to avoid causing a further release of the contaminants and to protect human health and the environment. The Obligors shall reimburse the reasonable actual costs incurred by the City or its contractors or agents in so identifying, investigating, removing, storing, handling or disposing of soil contaminated with Thorium Residuals above the Cleanup Criteria, and it shall not be a defense for the Obligors that those costs were not consistent with or required by United States Environmental Protection Agency regulations, guidelines or policies. Prior to incurring any such costs, the City shall first give the Obligors thirty days notice, unless there is an urgent reason otherwise, to remove or dispose of soil contaminated with Thorium Residuals above the Cleanup Criteria to the extent necessary for the City's work. The City will cooperate with the Obligors in the conduct of the work including providing reasonable and appropriate access. USEPA shall also be forwarded a copy of this notice. Failure to give this

opportunity to the Obligor shall not be a defense to a claim for reimbursement or that the work should not have been done. If no such notice and opportunity are provided by the City to the Obligor and there was no urgent reason otherwise, the City's claim for reimbursement against the Obligor for such costs shall not exceed \$10,000.00. For the purpose of this Agreement only, there is a rebuttable presumption that Thorium Residuals found in the portions of the impacted rights-of-way or in other portions of the designated rights-of-way subsequently identified as containing contaminants associated with Thorium Residuals arose from the release of Thorium Residuals from the Site. Should the Obligor not reimburse the costs identified here, this Agreement shall be null and void in addition to such other remedies as may be available to the City.

6. The Obligor agrees to indemnify and hold harmless the City, its agents and employees, and contractors, for all obligations asserted against or costs incurred by them associated with the release of contaminants associated with Thorium Residuals in the impacted rights-of-way or in other portions of the designated rights-of-way subsequently identified as containing Thorium Residuals.
7. Violation of the terms of this Agreement by the Obligor, or their successor(s) in interest, may be grounds for voidance of this Agreement.
8. No violation of a permit by a third party shall constitute a breach of this Agreement by the City. The Obligor also agrees that their personnel, if any, at the Site will exercise due diligence in notifying those accessing contaminated soil in the impacted rights-of-way of their rights and responsibilities under this Agreement.
9. Should the City breach this Agreement, the Obligor's sole remedy is for an action for damages in the Circuit Court of Cook County. Any and all claims for damages against the City, its agents, contractors, employees or its successors in interest arising at any time are limited to an aggregate maximum of \$20,000.00. No other breach by the City, its agents, contractors, employees or its successors in interest of a provision of this Agreement is actionable in either law or equity by the Obligor against the City or them and the Obligor hereby release the City, its agents, contractors, employees and its successors in interest for any cause of action it may have against them, other than as allowed in this paragraph, arising under this Agreement or environmental laws, regulations or common law governing contaminated soil in the designated rights-of-way. Should the City convey, vacate or transfer jurisdiction of the designated rights-of-way, the Obligor may pursue an action under this Agreement, not limited in amount, against the successors in interest, other than the City, or any of its departments, or State agency, in a Court of Law.
10. The City will limit access to the rights-of-way as follows:
 - a. Normal Access: The City will limit access to designated rights-of-way via the City Department of Transportation ("CDOT"), or its successor entity. Pursuant to §§10-20-100 and 10-20-150 of the Municipal Code of Chicago, a permit must be

issued by CDOT to any party, including the City, requesting to perform subsurface work in a City right-of-way. CDOT maintains and will maintain a permit database which, in conjunction with the City Department of Environment ("DOE"), tracks City rights-of-way with reported subsurface contamination. CDOT will consult the database whenever a party requests such a permit. The CDOT permit database will indicate the reported contamination under the impacted rights-of-way and it will indicate that radiation surveillance must be performed before and during excavations performed on other impacted rights-of-way subsequently identified as containing contaminants associated with Thorium Residuals through sampling and analysis. The permit database will also indicate that radiation surveillance must be performed during excavation or other work that disturbs or exposes the soil beneath the designated right-of-way. The CDOT database will direct the permit applicant to DOE to obtain detailed information on the nature and extent of the contamination and of the radiation surveillance requirements for any excavation near other impacted rights-of-way subsequently identified as containing contaminants associated with Thorium Residuals. After the permit applicant consults with DOE, the applicant must complete a form where the applicant acknowledges that it is aware of the contamination, will take appropriate steps to ensure the health and safety of people working in the impacted rights-of-way, and agrees to follow the health and safety plan for Thorium Residuals for these rights-of-way ("Health and Safety Plan"), attached as Attachment F, or other plan reviewed by USEPA that provides equal or greater health and safety protections, and to dispose of Thorium Residuals as required by law. DOE will provide written notice to River East, Kerr-McGee and USEPA at the time permit applicants contact DOE about the designated rights-of-ways and the radiation surveillance requirements.

- b. Emergency Access: The City Board of Underground ("BOU"), the City Department of Buildings, and the Chicago Fire Department, or their successor entities, will be notified of the contamination at the impacted rights-of-way and will be forwarded copies of all available environmental data regarding the impacted rights-of-way, including the Health and Safety Plan. BOU will provide this information to all utilities in the area. In the event of an emergency that occurs outside of CDOT business hours, this will enable utilities to provide their personnel with the appropriate information to ensure that proper health and safety precautions are taken.

- 11. The City will place and maintain placards in any underground access in the rights-of-way that state "Before Work, Contact Chicago Department of Transportation."

12. Notice for purposes of this Agreement should go to the following:

City of Chicago:
Commissioner
Department of Environment
30 N. LaSalle Street
25th Floor
Chicago, IL 60602
312/744-7606

River East LLC
contact Kevin Augustyn
Randy Grueb
Charles Langenfeld
455 East Illinois
Suite 565
Chicago, IL 60611
Telephone: 312/321-8900
Facsimile: 312/755-2750

and:

Vincent S. Oleszkiewicz
counsel for River East LLC/MCL Companies
Baker & McKenzie
130 East Randolph Drive
Chicago, IL 60601
Telephone: 312/861-3737
Facsimile: 312/861-2899

Kerr-McGee
contact: Dan White
Kerr-McGee Center
Oklahoma City, OK 73125
Telephone: 405/270-3792
Facsimile: 405/270-3787

and:

Richard Meserve
counsel for Kerr-McGee
Covington & Burling
1201 Pennsylvania Ave., N.W.

Washington, D.C. 20044
Telephone: 202/662-5304
Facsimile: 202/662-6291

U.S. EPA Region 5
Lindsay Light II Site, Office of Regional Counsel
contact: Mary Fulghum
77 West Jackson Boulevard
Chicago, IL 60604-3590
Telephone: 312/886-4683
Facsimile: 312/886-0747

13. Obligors, and any of their successor(s) by merger or reorganization pursuant to paragraph 1 of this Agreement, shall, at least 15 days prior to such subsequent merger or reorganization, give written notice and a copy of this Agreement to subsequent successor entity(ies), and provide written notice thereof to the City. The notice to the City shall include the name and address of the successor entity(ies).
14. If any provision of this Agreement is determined to exceed the authority of the City, or if any provision of this Agreement is declared null and void or unenforceable by any court or tribunal having jurisdiction, then this Agreement shall be null and void. If this Agreement is declared null and void, the information about the contamination will remain in the CDOT database and all permit applicants will be required to consult with DOE as described above. Similarly, the Emergency Access procedures described above will remain in force if the Agreement is declared null and void.
15. This Agreement shall continue in effect from the date of the Agreement until the Thorium Residuals in the soil are subsequently reduced through active remediation to levels approved by USEPA, such that unrestricted access to the impacted rights-of-way or other portions of the designated rights-of-way subsequently identified as containing contaminants associated with Thorium Residuals is demonstrated to be appropriate and there is no longer a need for this Agreement, and USEPA has, upon written request to the USEPA and notice to the City, provided a written determination authorizing unencumbered access to the impacted rights-of way.
16. Nothing in this Agreement shall be deemed to create any right or obligation in any person not a party hereto and this Agreement shall not be construed in any respect to be a contract in whole or in part for the benefit of any third party nor an admission of any fact, condition or obligation by or for the benefit of any third party, nor shall any statement herein be considered an admission of fact for any purpose or use outside this Agreement. Nothing in this Agreement shall preclude the City, Kerr-McGee or River East from petitioning U.S. EPA for a relaxation of the Cleanup Criteria, if circumstances so warrant.

IN WITNESS WHEREOF, the City of Chicago caused this Agreement to be signed by its duly authorized representative:

BY: _____
Commissioner
Department of Environment
City of Chicago

Date: _____

IN WITNESS WHEREOF, River East, L.L.C. has caused this Agreement to be signed by its duly authorized representative:

River East, L.L.C.
By: River East, L.L.C.
Its: Sole Member
By: River East, L.L.C.
Its: Manager

By: _____
Its: _____

IN WITNESS WHEREOF, Kerr McGee Chemical L.L.C. has caused this Agreement to be signed by its duly authorized representative:

BY: *George D. Christiansen*
George D. Christiansen
Vice President

Date: 09/24/99

IN WITNESS WHEREOF, the City of Chicago caused this Agreement to be signed by its duly authorized representative:

BY: _____
Commissioner
Department of Environment
City of Chicago

Date: _____

IN WITNESS WHEREOF, River East, L.L.C. has caused this Agreement to be signed by its duly authorized representative:

River East, L.L.C.
By: ~~River East, L.L.C.~~ *LLC*
Its: ~~Sole Member~~
~~By: River East, L.L.C.~~
Its: Manager

By: *David McLean*
Its: *Manager*


9/27/99

IN WITNESS WHEREOF, Kerr McGee Chemical L.L.C. has caused this Agreement to be signed by its duly authorized representative:

BY: _____

Date: _____

IN WITNESS WHEREOF, the City of Chicago caused this Agreement to be signed by its duly authorized representative:

BY: 
Commissioner
Department of Environment
City of Chicago

Date: 9/24/99

IN WITNESS WHEREOF, River East, L.L.C. has caused this Agreement to be signed by its duly authorized representative:

River East, L.L.C.
By: River East, L.L.C.
Its: Sole Member
By: River East, L.L.C.
Its: Manager

By: _____
Its: _____

IN WITNESS WHEREOF, Kerr McGee Chemical L.L.C. has caused this Agreement to be signed by its duly authorized representative:

BY: _____

Date: _____

ATTACHMENTS

- A- [Intentionally Omitted]
- B- AOC
- C- UAO
- D- Designated rights-of-way
- E- Impacted rights-of-way
- F- Health & Safety Plan

ATTACHMENT A

[Intentionally Omitted]

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

V-W- '94-C-223

IN THE MATTER OF:	)	Docket No.
)	
Lindsay Light II Site	)	ADMINISTRATIVE ORDER BY
316 East Illinois Street	)	CONSENT PURSUANT TO
Chicago, Illinois	)	SECTION 106 OF THE
	)	COMPREHENSIVE
	)	ENVIRONMENTAL RESPONSE,
Respondent:	)	COMPENSATION AND
	)	LIABILITY ACT OF 1980,
The Chicago Dock & Canal Trust	)	as amended, 42 U.S.C.
	)	Section 9606(a)

PREAMBLE

The United States Environmental Protection Agency (U.S. EPA) and the Respondent have each agreed to the making and entry of this Order by Consent.

It is issued pursuant to the authority vested in the President of the United States by Sections 106(a) and 122 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. Section 9606(a), as amended by the Superfund Amendments and Reauthorization Act of 1986, Pub. L. 99-499 (CERCLA), and delegated to the Administrator of the U.S. EPA by Executive Order No. 12580, January 23, 1987, 52 Federal Register 2923, and further delegated to the Assistant Administrator for Solid Waste and Emergency Response and the Regional Administrators by U.S. EPA Delegation Nos. 14-14, 14-14-C and 14-14-D, and to the Director, Waste Management Division, Region V, by Regional Delegation Nos. 14-14-A, 14-14-C and 14-14-D.

A copy of this Order will also be provided to the State of Illinois, which has been notified of the issuance of this Order as required by Section 106(a) of CERCLA, 42 U.S.C. Section 9606(a).

This Order requires the Respondent to undertake and complete emergency investigation and sampling activities to abate conditions which may present an imminent and substantial endangerment to the public health or welfare or the environment because of an actual or threatened release of hazardous substances at the Site.

FINDINGS

Based on available information, including the Administrative Record in this matter, U.S. EPA hereby finds:

1. The Lindsay Light II Site ("the Site" or "the Facility") is located at 316 East Illinois Street, Chicago, Cook County, Illinois. The Site is situated in a urban area called the Gold Coast, and is surrounded by commercial and residential buildings. A shopping mall is located approximately 200 feet to the southeast. The Chicago River is located 1 mile south of the Site and Lake Michigan is about 1.5 miles east of the Site.
2. The Site is currently a parking lot operated by General Parking and owned by The Chicago Dock and Canal Trust.
3. Until 1936, Lindsay Light manufactured incandescent gas mantels at 161 East Grand, which is .25 miles from the Site. It is unknown if they worked elsewhere; however, Sanborn maps from 1906 do show Lindsay Light being at other Chicago locations. During 1931-1936, the company moved its operations to West Chicago, Illinois.
4. The principle ingredient in gas mantle manufacture is thorium as a nitrate. Small amounts of cerium, beryllium and magnesium nitrates are also used. Thorium occurs principally as the parent radionuclide thorium-232 in association with its daughter products in a decay sequence known as the Thorium Decay Series. Thorium radionuclides are also found in the Uranium Decay Series and the Actinium Decay Series. It is believed that the principal source of contamination at this Site is the Thorium Decay Series.
5. It is unclear what Lindsay Light actually did at 316 East Illinois; however, records from The Chicago Dock and Canal Trust indicate this Site was a stable, and that Lindsay Light leased portions of the building from The Chicago Dock and Canal Trust from 1915-1933.
6. On June 3, 1993, U.S. EPA and the Illinois Department of Nuclear Safety conducted a joint investigation at the Site. This investigation verified the presence of radioactivity at levels clearly above natural background. Gamma readings were found as high as 280 uR/hr on a Ludlum Model 19 Micro-R meter. Background measured at the Site had gamma readings of 20 uR/hr.

DETERMINATIONS

Based on the foregoing Findings, U.S. EPA has determined that:

1. The Lindsay Light II Site is a "facility" as defined by Section 101(9) of CERCLA, 42 U.S.C. Section 9601(9).

2. The Chicago Dock & Canal Trust is a "person" as defined by Section 101(21) of CERCLA, 42 U.S.C. Section 9601(21).

4. Radionuclides are "hazardous substances" as defined by Section 101(14) of CERCLA, 42 U.S.C. Section 9601(14).

5. The detection of gamma rays as high as 280 uR/hr constitutes an actual or threatened "release" as that term is defined in Section 101(22) of CERCLA, 42 U.S.C. Section 9601(22).

6. The actual or threatened release of hazardous substances from the Facility may present an imminent and substantial endangerment to the public health, welfare, or the environment.

7. The actions required by this Order, if properly performed, are consistent with the National Contingency Plan (NCP), 40 CFR Part 300, as amended, and CERCLA; and are reasonable and necessary to protect the public health, welfare and the environment because of the following factors:

- a. actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, pollutants or contaminants;

This factor is present at the Facility due to the existence of a public parking lot on property found to have gamma readings measured as high as 280 microroentgen per hour (uR/hr) on a Ludlum Model 19 Micro-R meter. Gamma rays are penetrating radiations indistinguishable from X-rays which can be absorbed by tissue in the human body. Furthermore, there are two parking attendants stationed at this parking lot on a 24-hour basis to collect fees, although initial readings taken on June 3, 1993, indicate that there were no levels above background where the attendants are stationed. U.S. EPA is monitoring the area to determine the potential dose. The Site is also surrounded by commercial and residential buildings, whose occupants use this parking lot and adjacent sidewalks. Situated 200 feet southeast of the Site is the North Pier shopping mall.

- b. high levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;

This factor is present at the Facility due to the existence of elevated gamma levels as high as 280 uR/hr on a Ludlum Model 19 Micro-R meter, as compared to 20 uR/hr for background as measured at the Site. These gamma levels may indicate higher levels in the soils because the parking lot is covered with asphalt and/or concrete, which attenuates radiation.

- c. other situations or factors which may pose threats to public health or welfare or the environment.

This factor is present at the Facility due to the property's potential for future development. Such construction might entail excavating into potentially contaminated soils for placement of building footings and cause increased releases into the environment and human exposure to contaminants.

ORDER

Based upon the foregoing Findings and Determinations, and pursuant to Section 106(a) of CERCLA, 42 U.S.C. Section 9606(a), it is hereby ordered and agreed that Respondent will undertake the following actions at the Facility:

1. Within sixty (60) calendar days after the effective date of this Order, the Respondent shall submit to U.S. EPA for approval, a Work Plan for the investigation and sampling activities ordered as set forth in Paragraph 4 below. The Work Plan shall provide a concise description of the activities to be conducted to comply with the requirements of this Order. The Work Plan shall be reviewed by U.S. EPA, which may approve, disapprove, require revisions, or modify the Work Plan. Respondent shall implement the Work Plan as finally approved by U.S. EPA, including any modifications. Once approved, the Work Plan shall be deemed to be incorporated into and made a fully enforceable part of this Order.
2. The Work Plan shall contain a site safety and health plan, a sampling and analysis plan, and a schedule of the work to be performed. The site safety and health plan shall be prepared in accordance with the Occupational Safety and Health Administration (OSHA) regulations applicable to Hazardous Waste Operations and Emergency Response, 29 CFR Part 1910, and with Illinois Department of Nuclear Safety (IDNS) regulations pertaining to radiation workers, non-radiation workers, and the general public, 32 Illinois Administrative Code Part 340. The Work Plan and other submitted documents shall demonstrate that the Respondent can properly conduct the actions required by this Order.
3. Respondent shall retain a contractor qualified to undertake and complete the requirements of this Order, and shall notify U.S. EPA of the name of such contractor within five (5) business days of the effective date of this Order. U.S. EPA retains the right to disapprove of any, or all, of the contractors and/or subcontractors retained by the Respondent. In the event U.S. EPA disapproves of a selected contractor, Respondent shall retain a different contractor to perform the work, and such selection shall be made within two (2) business days following U.S. EPA's disapproval.

4. Within thirty (30) calendar days after U.S. EPA approval of the Work Plan, Respondent shall commence implementation of the Work Plan as approved or modified by U.S. EPA. Failure of the Respondent to properly implement all aspects of the Work Plan shall be deemed to be a violation of the terms of this Order. The Work Plan shall require the Respondent to perform, and complete within one hundred fifty (150) calendar days after approval, the following investigation and sampling activities:

- a. Develop and implement a Site Health and Safety Plan.
- b. Conduct land surveying to the extent necessary to locate all property boundaries and features, sample locations and areas having elevated radiation levels.
- c. Place borings in several locations for the purpose of measuring subsurface radiation levels. Measurements shall be recorded until the natural soils are reached or radiation levels reach background, whichever is the greatest depth.
- d. Collect soil samples from the borings and analyze for radionuclide content and RCRA characteristics. These results will then be used by the Respondent to correlate subsurface radiation levels and radionuclide content.

5. All materials removed from the Site shall be disposed of or treated at a facility approved by the On-Scene Coordinator and in accordance with the Resource Conservation and Recovery Act of 1976 (RCRA), 42 U.S.C. Section 6901, et seq., as amended, the U.S. EPA Revised Off-Site Policy, and all other applicable Federal, State, and local requirements.

6. On or before the effective date of this Order, the Respondent shall designate a Project Coordinator. The U.S. EPA has designated Verneta Simon, of the Emergency and Enforcement Response Branch, Response Section III, as its On-Scene Coordinator. The On-Scene Coordinator and the Project Coordinator shall be responsible for overseeing the implementation of this Order. To the maximum extent possible, communication between the Respondent and the U.S. EPA, and all documents, reports and approvals, and all other correspondence concerning the activities relevant to this Order, shall be directed through the On-Scene Coordinator and the Project Coordinator. During implementation of the Work Plan, the OSC and the Project Coordinator shall, whenever possible, operate by consensus, and shall attempt in good faith to resolve disputes informally through discussion of the issues.

7. The U.S. EPA and the Respondent shall each have the right to change their respective designated On-Scene Coordinator or Project Coordinator. U.S. EPA shall notify the Respondent, and

Respondent shall notify U.S. EPA, as early as possible before such a change is made. Notification may initially be verbal, but shall promptly be reduced to writing.

8. The U.S. EPA On-Scene Coordinator shall have the authority vested in an On-Scene Coordinator by the NCP, 40 CFR Part 300, as amended, including the authority to halt, conduct, or direct any work required by this Order, or to direct any other response action undertaken by U.S. EPA or the Respondent at the facility.

9. No extensions to the time frames in this Order shall be granted without sufficient cause. All extensions must be requested, in writing, and shall not be deemed accepted unless approved, in writing, by U.S. EPA.

10. This Order and all instructions by the U.S. EPA On-Scene Coordinator or designated alternate that are consistent with the National Contingency Plan and this Order shall be binding upon the Respondent, and the employees, agents, contractors, successors and assigns of the Respondent.

11. To the extent that the Facility or other areas where work under this Order is to be performed is owned by, or in possession of, someone other than the Respondent, Respondent shall attempt to obtain all necessary access agreements. In the event that after using it's best efforts the Respondent is unable to obtain such agreements, Respondent shall immediately notify U.S. EPA and U.S. EPA may then assist Respondent in gaining access, to the extent necessary to effectuate the response activities described herein, using such means as it deems appropriate.

12. Respondent shall provide access to the Facility to U.S. EPA employees, and U.S. EPA-authorized contractors, agents, and consultants at any time, and shall permit such persons to be present and move freely in the area in order to conduct inspections, including taking photographs and videotapes of the Facility, to do cleanup/stabilization work, to take samples, to monitor the work under this Order, and to conduct other activities which the U.S. EPA determines to be necessary.

13. This Order shall be effective on the date of signature by the Director, Waste Management Division.

14. Respondent shall provide a written monthly progress report to the On-Scene Coordinator regarding the actions and activities undertaken under this Order. At a minimum, these progress reports shall describe the actions that have been taken to comply with this Order, including all results of sampling and tests received or prepared by the Respondent and shall describe all significant work items planned for the next month.

15. Respondent agrees to retain for six years following completion of the activities required by this Order copies of all records, files and data relating to hazardous substances found on the Site, or related to the activities undertaken pursuant to this Order, whether or not those documents were created pursuant to this Order. Respondent shall acquire and retain copies of all documents relating to the Site that are in the possession of its contractors, agents and employees. Respondent shall notify U.S. EPA at least sixty (60) calendar days before any documents retained under this paragraph are to be destroyed. The documents retained under this paragraph shall be made available to the U.S. EPA upon request.

16. The United States reserves its right to seek reimbursement from the Respondent of all past costs and oversight costs it incurs with regards to the Lindsay Light II Site that are not inconsistent with the National Contingency Plan. Nothing in this Order shall be construed as a waiver of that right.

17. A notice, document, information, report, plan, approval, disapproval or other correspondence required to be submitted from one party to another under the Order shall be deemed submitted either when hand delivered or as of the date of receipt by certified mail, return receipt requested.

Submissions to the Respondent shall be submitted to:

The Chicago Dock & Canal Trust
c/o Mr. Charles Gardner, President
455 East Illinois Street
Suite 565
Chicago, Illinois 60611

Submissions to the U.S. EPA shall be submitted to:

Verneta Simon
On-Scene Coordinator
U.S. Environmental Protection Agency
77 West Jackson Boulevard, HSE-5J
Chicago, Illinois 60604

18. If any provision of this Order is deemed invalid or unenforceable, the remainder of this Order shall remain in full force and effect.

STIPULATED PENALTIES

19. For each day the Respondent fails to meet the deadlines set forth in the Consent Order and Work Plan, Respondent shall be liable as follows:

Penalty For:

	<u>First Week or Part Thereof</u>	<u>Each Following Week or Part Thereof</u>
Failure to Submit the Work Plan, Site Safety and Health Plan, Sampling and Analysis Plan or the Schedule of Work to be Performed	\$1,000	\$1,750
Failure to Commence Implementation of the Work Plan	\$1,000	\$1,750
Failure to Meet any Scheduled Deadline in the Work Plan	\$1,000	\$1,750
Failure to Submit Monthly Reports	\$ 250	\$ 400

20. All penalties which accrue pursuant to the requirements of this Order shall be paid within fifteen (15) business days of written demand by U.S. EPA. Payment shall be made to the EPA Hazardous Substances Superfund delivered to the U.S. EPA, Attn: Superfund Accounting, P.O. Box 70753, Chicago, Illinois 60673, in the form of a certified or cashier's check payable to "EPA Hazardous Substances Superfund." The face of the check should note that the payment is for the Lindsay Light II Site.

21. Pursuant to 31 U.S.C. Section 3717, interest shall accrue on any amount of overdue stipulated penalties at a rate established by the United States Treasury. Stipulated penalties shall accrue, but need not be paid, during any dispute resolution period concerning the particular penalties at issue. If Respondent prevails upon resolution, Respondent shall pay only such penalties as the resolution requires.

22. Payment of Stipulated Penalties will not relieve Respondent from complying with the terms of this Consent Order. U.S. EPA retains the right to seek any remedies or sanctions available to U.S. EPA by reason of Respondent's noncompliance with the provisions of this Consent Order that are not otherwise expressly limited by these Stipulated Penalty provisions.

PENALTIES FOR NONCOMPLIANCE

23. Respondent is advised pursuant to Section 106(b) of CERCLA, 42 U.S.C. Section 9606(b), that violation or subsequent failure or refusal to comply with this Order and any Work Plan approved under this Order, or any portion thereof, may subject the Respondent to a civil penalty of no more than \$25,000 per day for each day in which such violation occurs, or such failure to comply continues. In addition, failure to properly provide investigation and sampling actions upon the terms of this order, or other subsequent orders issued by U.S. EPA, may result in liability for punitive damages pursuant to Section 107(c)(3) of CERCLA, 42 U.S.C Section 9607(c)(3).

TERMINATION AND SATISFACTION

24. The Respondent shall submit a final report summarizing the actions taken to comply with this Order. The report shall contain, at a minimum: identification of the facility, a description of the locations and types of hazardous substances encountered at the facility upon the initiation of work performed under this Order, a chronology and description of the actions performed (including both the organization and implementation of response activities), a listing of the resources committed to perform the work under this Order (including financial, personnel, mechanical and technological resources), identification of all items that affected the actions performed under the Order and discussion of how all problems were resolved, a listing of quantities and types of materials removed, a discussion of removal and disposal options considered for those materials, a listing of the ultimate destination of those materials, and a presentation of the analytical results of all sampling and analyses performed and accompanying appendices containing all relevant paperwork accrued during the action (e.g., manifests, invoices, bills, contracts, permits). The final report shall also include an affidavit from a person who supervised or directed the preparation of that report. The affidavit shall certify under penalty of law that based on personal knowledge and appropriate inquiries of all other persons involved in preparation of the report, the information submitted is true, accurate and complete to the best of the affiant's knowledge and belief. The report shall be submitted within sixty (60) calendar days of completion of the work required by the U.S. EPA.

25. The provisions of this Order shall be deemed satisfied upon payment by Respondent of all sums due under the terms of this Order and upon the Respondent's receipt of written notice from U.S. EPA that the Respondent has demonstrated, to the satisfaction of U.S. EPA, that all of the terms of this Order,

including any additional tasks consistent with this Consent Order which U.S. EPA has determined to be necessary, have been completed.

INDEMNIFICATION

26. The Respondent agrees to indemnify and save and hold harmless the United States Government, its agencies, departments, agents, and employees, from any and all claims or causes of action arising from, or on account of, acts or omissions of the Respondent, its officers, employees, receivers, trustees, agents, successors or assigns, in carrying out the activities pursuant to this Order. The United States Government shall not be held as a party to any contract entered into by the Respondent in carrying out activities under this Order.

RESERVATION OF RIGHTS

27. This Order is not intended for the benefit of any third party and may not be enforced by any third party.

28. The U.S. EPA and the Respondent reserve all rights, claims, demands, and defenses, including defenses and denials of and to all determinations and findings, that they may have as to each other except as otherwise provided in this Order pursuant to any available legal authority. Nothing in this Order shall expand the Respondent's ability to obtain preenforcement review of U.S. EPA actions. Notwithstanding any reservation of rights, Respondent agrees to comply with the terms and conditions of this Order and consents to the jurisdiction of the U.S. EPA to enter into and enforce this Order.

29. Nothing herein is intended to release, discharge, limit or in any way affect any claim, causes of action or demands in law or equity which the parties may have against any persons, firm, trust, joint venture, partnership, corporation, or other entity not a party to this Order for any liability it may have arising out of, or relating in any way to, the generation, storage, treatment, handling, transportation, disposal, release or threat of release of any hazardous substance, hazardous waste, contaminant or pollutant at or from the Site. The parties to this Order hereby expressly reserve all rights, claims, demands and causes of action they may have against any and all other persons and entities who are not parties to this Order.

30. Nothing herein shall be construed: 1) to prevent U.S. EPA from exercising its right to disapprove of work performed by the Respondent; 2) to prevent U.S. EPA from seeking legal or equitable relief to enforce the terms of this order; 3) to prevent U.S. EPA from taking other legal or equitable action not

inconsistent with the Covenant Not To Sue in Paragraphs 41 through 43 of this Order; 4) to prevent U.S. EPA from requiring the Respondent in the future to perform additional activities pursuant to CERCLA, 42 U.S.C. Section 9601 et seq., or any other applicable law; or 5) to prevent U.S. EPA from undertaking response actions at the Site.

FORCE MAJEURE

31. The Respondent shall cause all work to be performed within the time limits set forth herein and in the approved Work Plan, unless performance is delayed by "force majeure". For purposes of this Order, "force majeure" shall mean an event arising from causes entirely beyond the control of the Respondent and its contractors which delays or prevents the performance of any obligation required by this Order. Increases in costs, financial difficulty, and normal inclement weather are examples of events that are not considered to be beyond the control of the Respondent.

32. Respondent shall notify the OSC within 24 hours after Respondent becomes aware of any event which Respondent contends constitutes a force majeure, with subsequent written notice within seven (7) calendar days of the event. Such written notice shall describe: 1) the nature of the delay, 2) the cause of the delay, 3) the expected duration of the delay, including any demobilization and remobilization resulting from the delay, 4) the actions which will be taken to prevent or mitigate further delay, and 5) the timetable by which the actions to mitigate the delay will be taken. Respondent shall implement all reasonable measures to avoid and/or minimize such delays. Failure to comply with the notice provision of this paragraph shall be grounds for U.S. EPA to deny Respondent an extension of time for performance. The Respondent shall have the burden of demonstrating by a preponderance of the evidence that the event is a force majeure, that the delay is warranted under the circumstances, and that best efforts were exercised to avoid and mitigate the effects of the delay. If U.S. EPA determines a delay is or was attributable to a force majeure, the time period for performance under this Order shall be extended as deemed necessary by the OSC to allow performance.

DISPUTE RESOLUTION

33. The Parties to this Order on Consent shall attempt to resolve expeditiously and informally any disagreements concerning implementation of this Order on Consent or any work required hereunder.

34. In the event that any dispute arising under this Order on Consent is not resolved expeditiously through informal means, any party desiring dispute resolution under this Section shall give prompt written notice to the other parties to the Order.

35. Within ten (10) calendar days of the service of notice of dispute pursuant to Paragraph 34 above, the party who gave notice shall serve on the other parties to this Order a written statement of the issues in dispute, the relevant facts upon which the dispute is based, and factual data, analysis or opinion supporting its position, and all supporting documentation on which such party relies (hereinafter the "Statement of Position"). The opposing parties shall serve their Statement of Position, including supporting documentation, no later than ten (10) calendar days after receipt of the complaining party's Statement of Position. In the event that these 10-day time periods for exchange of Statements of Position may cause a delay in the work, they shall be shortened upon and in accordance with notice by U.S. EPA.

36. An administrative record of any dispute under this Section shall be maintained by U.S. EPA. The record shall include the written notification of such dispute, and the Statements of Position served pursuant to the preceding paragraphs.

37. Upon review of the administrative record, the Director of the Waste Management Division, U.S. EPA, Region V, shall resolve the dispute consistent with the NCP and the terms of this Order.

NON-ADMISSION

38. The consent of the Respondent to the terms of this Order shall not constitute or be construed as an admission of liability or of U.S. EPA's findings or determinations contained in this Order in any proceeding other than a proceeding to enforce the terms of this Order.

CERCLA FUNDING

39. The Respondent waives any claims or demands for compensation or payment under Sections 106(b), 111 and 112 of CERCLA against the United States or the Hazardous Substance Superfund established by 26 U.S.C. §9507 for, or arising out of, any activity performed or expenses incurred pursuant to this Consent Order.

40. This Consent Order does not constitute any decision on preauthorization of funds under Section 111(a)(2) of CERCLA.

COVENANT NOT TO SUE

41. Upon termination and satisfaction of this Administrative Order pursuant to its terms, for and in consideration of the complete and timely performance by Respondent of the obligations agreed to in this Order, U.S. EPA hereby covenants not to sue Respondent for judicial imposition of damages or civil penalties for any failure to perform obligations agreed to in this Order except as otherwise reserved herein.

42. Performance of the terms of this Order resolves and satisfies the liability of the Respondent to U.S. EPA for work satisfactorily performed under this Order. U.S. EPA recognizes that, pursuant to Section 113 of CERCLA, the Respondent, upon having resolved its liability with the U.S. EPA for the matters expressly covered by this Order, shall not be liable for claims for contribution regarding matters addressed in this Order. Nothing in this Order precludes the Respondent from asserting any claims, causes of action or demands against potentially responsible parties (PRPs) who are not parties to this Order for indemnification, contribution, or cost recovery.

43. In consideration of the actions to be performed by the Respondent under this Order, the U.S. EPA covenants not to sue the Respondent, its successors or assigns for any and all claims which are available to the U.S. as against the Respondent under Sections 106 and 107 of CERCLA concerning all matters satisfactorily performed.

SUBSEQUENT AMENDMENT

44. This Consent Order may be amended by mutual agreement of U.S. EPA and the Respondent. Any amendment of this Consent Order shall be in writing, signed by U.S. EPA and the Respondent and shall have as the effective date, that date on which such amendment is signed by U.S. EPA.

LINDSAY LIGHT II SITE
CHICAGO, ILLINOIS

SIGNATORIES

Each undersigned representative of a signatory to this Administrative Order on Consent certifies that he or she is fully authorized to enter into the terms and conditions of this Order and to bind such signatory, its directors, officers, employees, agents, successors and assigns, to this document.

Agreed this 10th day of January, 1994.

By Charles K. Kline President
The Chicago Dock & Canal Trust

The above being agreed and consented to, it is so ORDERED
this 27th day of January, 1994.

By William E. Muno
William E. Muno, Director
Waste Management Division
U.S. Environmental Protection Agency
Region V, Complainant

bcc: Docket Analyst, ORC (CS-3T)
Marc Radell, ORC (CS-3T)
Verneta Simon, OSC (HSE-5J)
Debbie Regel, ESS (HSE-5J)
Jose Cisneros, ESS (HSE-5J)
Mary Ellen Ryan, SFAS (MF-10J)
Oliver Warnsley, CRS (HSM-5J)
EERB Site File
EERB Read File
Toni Lesser, Public Affairs (P-19J) w/out attachments
Sheila Huff, Department of Interior
Larry Jensen, ARD (AT-18J)

STATE SUPERFUND COORDINATORS:

Illinois:

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Indiana Department of
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 5

IN THE MATTER OF:

Lindsay Light II Site
Chicago, Illinois

Respondents:

The Chicago Dock & Canal Trust
Kerr-McGee Chemical Corporation-

) Docket No. V-W. '86-C-35
)
) ADMINISTRATIVE ORDER
) PURSUANT TO SECTION 106(a)
) OF THE COMPREHENSIVE
) ENVIRONMENTAL RESPONSE,
) COMPENSATION, AND
) LIABILITY ACT OF 1980,
) AS AMENDED, 42 U.S.C.
) SECTION 9606(a)

I. JURISDICTION AND GENERAL PROVISIONS

This Order is issued pursuant to the authority vested in the President of the United States by Section 106(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. § 9606(a), and delegated to the Administrator of the United States Environmental Protection Agency ("U.S. EPA") by Executive Order No. 12580, January 23, 1987, 52 Federal Register 2923, and further delegated to the Regional Administrators by U.S. EPA Delegation Nos. 14-14-A and 14-14-B, and to the Director, Superfund Division, Region 5, by Regional Delegation Nos. 14-14-A and 14-14-B.

This Order pertains to property located at 316 East Illinois Street, Chicago, Illinois (the "Lindsay Light II Site" or the "Site"). This Order requires the Respondents to conduct removal activities described herein to abate an imminent and substantial endangerment to the public health, welfare or the environment that may be presented by the actual or threatened release of hazardous substances at or from the Site.

U.S. EPA has notified the State of Illinois of this action pursuant to Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

II. PARTIES BOUND

This Order applies to and is binding upon Respondents and Respondents' heirs, receivers, trustees, successors and assigns. Any change in ownership or corporate status of Respondents including, but not limited to, any transfer of assets or real or personal property shall not alter such Respondents' responsibilities under this Order. Respondents are jointly and severally liable for carrying out all activities required by this Order. Compliance or noncompliance by one or more Respondent with any provision of this Order shall not excuse or justify noncompliance by any other Respondent.

Respondents shall ensure that their contractors, subcontractors, and representatives comply with this Order. Respondents shall be responsible for any noncompliance.

III. FINDINGS OF FACT

Based on available information, including the Administrative Record in this matter, U.S. EPA hereby finds that:

1. The Lindsay Light II Site ("the Site" or "the Facility") is located at 316 East Illinois Street, Chicago, Cook County, Illinois. The Site is situated in an urban area called the Gold Coast, and is surrounded by commercial and residential buildings. A shopping mall is located approximately 200 feet to the southeast. The Chicago River is located 1 mile south of the Site, and Lake Michigan is about 1.5 miles east of the Site.
2. The Site is currently a parking lot operated by General Parking, and owned by the Chicago Dock and Canal Trust ("CDCT").
3. Until 1936, Lindsay Light manufactured incandescent gas mantels at 161 East Grand, which is .25 miles from the Site. It is unknown if they worked elsewhere; however, Sanborn maps from 1906 do show Lindsay Light being at other Chicago locations. During 1931-1936, the company moved its operations to West Chicago, Illinois.
4. The principal ingredient in gas mantle manufacture is thorium as a nitrate. Small amounts of cerium, beryllium and magnesium nitrates are also used. Thorium occurs principally as the parent radionuclide thorium-232 in association with its daughter products in a decay sequence known as the Thorium Decay Series. Thorium radionuclides are also found in the Uranium Decay Series and the Actinium Decay Series. It is believed that the principal source of contamination at this Site is the Thorium Decay Series.
5. It is unclear what Lindsay Light actually did at 316 East Illinois; however, records from The Chicago Dock and Canal Trust indicate this Site was a stable, and that Lindsay Light leased portions of the building from The Chicago Dock and Canal Trust from 1915-1933.
6. On June 3, 1993, U.S. EPA and the Illinois Department of Nuclear Safety conducted a joint investigation at the Site. This investigation verified the presence of radioactivity at levels clearly above natural background. Gamma readings were found as high as 280 uR/hr on a Ludlum Model 19 Micro-R meter. Background measured at the Site had gamma readings of 20 uR/hr.

7. The Chicago Dock and Canal Trust entered into an Administrative Order by Consent ("AOC") with U.S. EPA to study the extent of subsurface radiation and radionuclide content before excavation. The AOC was signed by U.S. EPA on January 27, 1994, and the extent of contamination ("EOC") study was completed by CDCT in May 1994. The final report concerning the extent of contamination was delivered to U.S. EPA on October 17, 1995, and was approved on March 13, 1996.
8. A brief summary of the final report approved by U.S. EPA on March 13, 1996, is as follows: 12 areas exhibit elevated gamma levels; the maximum contamination depth extends to 2.5 meters (8 feet) below the ground surface; and Resource Conservation and Recovery Act ("RCRA")-characteristic waste is not present on-site. The highest gamma level is 252 times above background, or 1.1 milliRoentgen per hour.
9. Activities completed at this Site, besides the extent of contamination study, have been the voluntary placement by CDCT of notices at the entrances to the parking lot informing patrons of the risks associated with the lot.

IV. CONCLUSIONS OF LAW AND DETERMINATIONS

Based on the Findings of Fact set forth above, and the Administrative Record supporting these removal actions, U.S. EPA determines that:

1. The Lindsay Light II Site is a "facility" as defined by Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).
2. Radionuclides are "hazardous substances" as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).
3. Each Respondent is a "person" as defined by Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).
4. Respondent The Chicago Dock & Canal Trust is the present "owner" and "operator" of the Lindsay Light II Site, as defined by Section 101(20) of CERCLA, 42 U.S.C. § 9601(20). Respondent Kerr-McGee Chemical Corporation is a person who is the corporate successor of the Lindsay Light Company. The Lindsay Light Company was the operator of the Lindsay Light II Site at the time of disposal of any hazardous substances, or who arranged for disposal or transport for disposal of hazardous substances at the Lindsay Light II Site. Respondents are therefore liable persons under Section 107(a) of CERCLA, 42 U.S.C. § 9607(a).

5. The conditions described in the Findings of Fact above constitute an actual or threatened "release" into the "environment" as defined by Sections 101(8) and (22) of CERCLA, 42 U.S.C. §§ 9601(8) and (22).

6. The conditions present at the Site constitute a threat to public health, welfare, or the environment based upon the factors set forth in Section 300.415(b)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan, as amended ("NCP"), 40 CFR Part 300. These factors include, but are not limited to, the following:

- a. actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, pollutants or contaminants;

This factor is present at the Site due to the existence of a public parking lot on property found to have gamma readings measured as high as 1.1 milliRoentgen per hour. This reading is 252 times the background level measured for the Site.

Gamma rays are penetrating radiation indistinguishable from X-rays which can be absorbed by tissue in the human body, thereby increasing the cancer risk for the person exposed. The excess risk to a transient spending 29 minutes per day for a 250 day work year at the peak exposure spot is 10^{-4} . Transients were judged to be parking lot customers, people using the lot for a short cut, or temporary workers.

The Site is surrounded by two-foot high steel guardrails, which do not totally restrict access. Furthermore, there are two parking attendants stationed at this parking lot on a 24-hour basis to collect fees, although initial readings taken on June 3, 1993, indicate that there were no levels above background where the attendants are stationed. Again, such an exposure entails cancer risk that would have no personal or societal benefit. Direct measurement with survey instruments at the present parking lot attendant stations found background radiation levels which were confirmed with longer measurements using thermoluminescent dosimeters ("TLDs") placed in the ticket booths between June 3, 1993, and June 30, 1993. Conditions at the Site have not changed since the site assessment on June 3, 1993. There is no guarantee that the ticket booths could not be moved to the peak point of gamma readings at some future time, thereby introducing the potential for exposure and risk to be actualized.

The EOC study confirmed that elevated radioactivity levels are due to past industrial processes. The Site is also surrounded by commercial and residential buildings, whose occupants use this parking lot and adjacent sidewalks. Situated 200 feet southeast of the Site is the North Pier shopping mall.

b. high levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;

This factor is present at the Site due to the existence of elevated gamma exposure levels which validates subsurface deposits of radiological contaminants. The dominant concern is intrusion into these materials that will contaminate the intruder and their equipment and, further, lead to dispersal or spreading of the contaminants from their present locations. Such a scenario probably has arisen, and could again arise, with parking lot excavation where workers and their equipment are contaminated by radioactive soils, dry soil dispersed in the wind, and excavation spoils moved off-site. The number of people exposed could greatly increase and might include workers who subsequently use contaminated machinery, residents near the parking lot who might come in contact with wind dispersed soils, and use of excavation spoils. Such spreading could occur within downtown Chicago where the parking lot is located and out for several miles depending upon where workers reside and where spoils are used.

c. other situations or factors that may pose threats to public health or welfare or the environment;

This factor is present at the Site due to the property's planned future development. Such construction would entail excavating into potentially contaminated soils for placement of building footings and cause increased releases into the environment and human exposure to contaminants. Also, it has not been determined whether subsurface contaminants are soluble. If they are, there could be spreading via groundwater.

This Site appears to be gridded with sewer lines. These could be conduits for the spread of both soluble and insoluble materials off-site, for extension of the region of contamination, and for an increase in the potential for sewer workers to be exposed to contaminants.

7. The actual or threatened release of hazardous substances from the Site may present an imminent and substantial endangerment to the public health, welfare, or the environment within the meaning of Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

8. The removal actions required by this Order are necessary to protect the public health, welfare, or the environment, and are not inconsistent with the NCP and CERCLA.

V. ORDER

Based upon the foregoing Findings of Fact, Conclusions of Law, Determinations, and the Administrative Record for this Site, U.S. EPA hereby orders that Respondents perform the following actions:

1. Notice of Intent to Comply

Respondents shall notify U.S. EPA in writing within 3 business days after the effective date of this Order of Respondents' irrevocable intent to comply with this Order. Failure of each Respondent to provide such notification within this time period shall be a violation of this Order.

2. Designation of Contractor, Project Coordinator, and On-Scene Coordinator

Respondents shall perform the removal actions themselves or retain contractors to implement the removal actions. Respondents shall notify U.S. EPA of Respondents' qualifications or the name and qualifications of such contractors, whichever is applicable, within 10 business days of the effective date of this Order. Respondents shall also notify U.S. EPA of the name and qualifications of any other contractors or subcontractors retained to perform work under this Order at least 5 business days prior to commencement of such work. U.S. EPA retains the right to disapprove of the Respondents or any of the contractors and/or subcontractors retained by the Respondents. If U.S. EPA disapproves a selected contractor, Respondents shall retain a different contractor within 2 business days following U.S. EPA's disapproval and shall notify U.S. EPA of that contractor's name and qualifications within 3 business days of U.S. EPA's disapproval.

Within 10 business days after the effective date of this Order, the Respondents shall designate a Project Coordinator who shall be responsible for administration of all the Respondents' actions required by the Order and submit the designated coordinator's name, address, telephone number, and qualifications to U.S. EPA. To the greatest extent possible, the Project Coordinator shall be present on-site or readily available during site work. U.S. EPA retains the right to disapprove of any Project Coordinator named by the Respondents. If U.S. EPA disapproves a selected Project Coordinator, Respondents shall retain a different Project Coordinator within 3 business days following U.S. EPA's disapproval and shall notify U.S. EPA of that person's name and qualifications within 4 business days of U.S. EPA's disapproval. Receipt by Respondents' Project Coordinator of any notice or communication from U.S. EPA relating to this Order shall constitute receipt by all Respondents.

The U.S. EPA has designated Verneta Simon of the Emergency Response Branch, Region 5, as its On-Scene Coordinator (OSC). Respondents shall direct all submissions required by this Order to the OSC at U.S. EPA, 77 West Jackson Boulevard, SE-5J, Chicago, Illinois, 60604-3590, by certified or express mail. Respondents shall also send a copy of all submissions to Nancy-Ellen Zusman, Assistant Regional Counsel, 77 West Jackson Boulevard, C-29A, Chicago, Illinois, 60604-3590. All Respondents are encouraged to make their submissions to U.S. EPA on recycled paper (which includes significant postconsumer waste paper content where possible) and using two-sided copies.

3. Work to Be Performed

Respondents shall perform, at a minimum, the following response activities:

- a. Develop and implement a Site Health and Safety Plan.
- b. Develop and implement Site security measures.
- c. Develop and implement an air monitoring program.
- d. Remove contamination until the cleanup criterion of 5 picoCuries per gram total radium (radium-226 + radium-228) over background is achieved. This cleanup criterion will be met in each 15 centimeter layer below the surface. Averaging over areas up to 100 square meters will be allowed, but only after reasonable efforts have been made to achieve levels As Low As Reasonably Achievable ("ALARA"). It is not U.S. EPA's intent to leave any elevated areas of contamination if at all possible.
- e. Establish local background for radium-226 and radium-228 from four soil samples taken on the property at points where the gamma exposure rates are lowest plus eight soil samples taken off-site, but in the immediate vicinity, of the parking lot.
- f. Transport and dispose of all characterized or identified hazardous substances, pollutants, wastes, or contaminants at a RCRA/CERCLA/IDNS-approved disposal facility in accordance with the U.S. EPA off-site policy.
- g. Conduct off-site surveying and sampling as necessary and, at a minimum, implement the standards of 40 Code of Federal Regulations ("CFR") 192, if deemed necessary should contamination be discovered beyond current site boundaries.

- h. . Backfill all excavations with suitable material, and if soil, test borrow source for radioactivity and other pertinent characteristics in 40 CFR Part 261.

3.1 Work Plan and Implementation

Within 15 calendar days after the effective date of this Order, the Respondents shall submit to U.S. EPA for approval a draft Work Plan for performing the removal activities set forth above. The draft Work Plan shall provide a description of, and an expeditious schedule for, the activities required by this Order.

U.S. EPA may approve, disapprove, require revisions to, or modify the draft Work Plan. If U.S. EPA requires revisions, Respondents shall submit a revised draft Work Plan within 7 business days of notification. Respondents shall implement the Work Plan as finally approved in writing by U.S. EPA in accordance with the schedule approved by U.S. EPA. Once approved, or approved with modifications, the Work Plan, the schedule, and any subsequent modifications shall be fully enforceable under this Order. Respondents shall notify U.S. EPA at least 48 hours prior to performing any on-site work pursuant to the U.S. EPA approved work plan.

Respondents shall not commence or undertake any removal actions at the Site without prior U.S. EPA approval.

3.2 Health and Safety Plan

Within 15 calendar days after the effective date of this Order, the Respondents shall submit a plan for U.S. EPA review and comment that ensures the protection of the public health and safety during performance of on-site work under this Order. This plan shall comply with applicable Occupational Safety and Health Administration (OSHA) regulations found at 29 CFR Part 1910. If U.S. EPA determines it is appropriate, the plan shall also include contingency planning. Respondents shall incorporate all changes to the plan recommended by U.S. EPA, and implement the plan during the pendency of the removal action.

3.3 Quality Assurance and Sampling

All sampling and analyses performed pursuant to this Order shall conform to U.S. EPA direction, approval, and guidance regarding sampling, quality assurance/quality control (QA/QC), data validation, and chain of custody procedures. Respondents shall ensure that the laboratory used to perform the analyses participates in a QA/QC program that complies with U.S. EPA guidance. Upon request by U.S. EPA, Respondents shall have such a laboratory analyze samples submitted by U.S. EPA for quality assurance monitoring. Respondents shall provide to U.S. EPA the quality assurance/quality control procedures followed by all sampling teams and laboratories performing data collection and/or

analysis. Respondents shall also ensure provision of analytical tracking information consistent with OSWER Directive No. 9240.0-2B, "Extending the Tracking of Analytical Services to PRP-Lead Superfund Sites."

Upon request by U.S. EPA, Respondents shall allow U.S. EPA or its authorized representatives to take split and/or duplicate samples of any samples collected by Respondents or their contractors or agents while performing work under this Order. Respondents shall notify U.S. EPA not less than 3 business days in advance of any sample collection activity. U.S. EPA shall have the right to take any additional samples that it deems necessary.

3.4 Reporting

Respondents shall submit a monthly written progress report to U.S. EPA concerning activities undertaken pursuant to this Order, beginning 30 calendar days after the date of U.S. EPA's approval of the Work Plan, until termination of this Order, unless otherwise directed by the OSC. These reports shall describe all significant developments during the preceding period, including the work performed and any problems encountered, analytical data received during the reporting period, and developments anticipated during the next reporting period, including a schedule of work to be performed, anticipated problems, and planned resolutions of past or anticipated problems.

Any Respondent that owns any portion of the Site, and any successor in title shall, at least 30 days prior to the conveyance of any interest in real property at the Site, give written notice of this Order to the transferee and written notice of the proposed conveyance to U.S. EPA and the State. The notice to U.S. EPA and the State shall include the name and address of the transferee. The party conveying such an interest shall require that the transferee will provide access as described in Section V.4 (Access to Property and Information).

3.5 Final Report

Within 60 calendar days after completion of all removal actions required under this Order, the Respondents shall submit for U.S. EPA review a final report summarizing the actions taken to comply with this Order. The final report shall conform to the requirements set forth in Section 300.165 of the NCP. The final report shall also include a good faith estimate of total costs incurred in complying with the Order, a listing of quantities and types of materials removed, a discussion of removal and disposal options considered for those materials, a listing of the ultimate destinations of those materials, a presentation of the analytical results of all sampling and analyses performed, and accompanying appendices containing all relevant documentation generated during the removal action (e.g., manifests, invoices, bills, contracts, and permits).

The final report shall also include the following certification signed by a person who supervised or directed the preparation of that report:

Under penalty of law, I certify that, to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of this report, the information submitted is true, accurate, and complete.

4. Access to Property and Information

Respondents shall provide or obtain access as necessary to the Site and all appropriate off-site areas, and shall provide access to all records and documentation related to the conditions at the Site and the activities conducted pursuant to this Order. Such access shall be provided to U.S. EPA employees, contractors, agents, consultants, designees, representatives, and State of Illinois representatives. These individuals shall be permitted to move freely at the Site and appropriate off-site areas in order to conduct activities which U.S. EPA determines to be necessary. Respondents shall submit to U.S. EPA, upon request, the results of all sampling or tests and all other data generated by Respondents or their contractors, or on the Respondents' behalf during implementation of this Order.

Where work under this Order is to be performed in areas owned by or in possession of someone other than Respondents, Respondents shall obtain all necessary access agreements within 14 calendar days after the effective date of this Order, or as otherwise specified in writing by the OSC. Respondents shall immediately notify U.S. EPA if, after using their best efforts, they are unable to obtain such agreements. Respondents shall describe in writing their efforts to obtain access. U.S. EPA may then assist Respondents in gaining access, to the extent necessary to effectuate the response activities described herein, using such means as U.S. EPA deems appropriate.

5. Record Retention, Documentation, Availability of Information

Respondents shall preserve all documents and information, in their possession or the possession of their contractors, subcontractors or representatives, relating to work performed under this Order, or relating to the hazardous substances found on or released from the Site, for six years following completion of the removal actions required by this Order. At the end of this six year period and at least 60 days before any document or information is destroyed, Respondents shall notify U.S. EPA that such documents and information are available to U.S. EPA for inspection, and upon request, shall provide the originals or copies of such documents and information to U.S. EPA. In addition, Respondents shall provide documents and information retained under this Section at any time before expiration of the six year period at the written request of U.S. EPA.

6. Off-Site Shipments

All hazardous substances, pollutants or contaminants removed off-site pursuant to this Order for treatment, storage or disposal shall be treated, stored, or disposed of at a RCRA/CERCLA/IDNS-approved disposal facility in compliance, as determined by U.S. EPA, with the U.S. EPA Off-Site Rule, 40 CFR § 300.440, 58 Federal Register 49215 (Sept. 22, 1993).

7. Compliance With Other Laws

All actions required pursuant to this Order shall be performed in accordance with all applicable local, state, and federal laws and regulations except as provided in CERCLA Section 121(e) and 40 CFR Section 300.415(i). In accordance with 40 CFR Section 300.415(i), all on-site actions required pursuant to this Order shall, to the extent practicable, as determined by U.S. EPA, considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws.

8. Emergency Response and Notification of Releases

If any incident, or change in Site conditions, during the activities conducted pursuant to this Order causes or threatens to cause an additional release of hazardous substances from the Site or an endangerment to the public health, welfare, or the environment, the Respondents shall immediately take all appropriate action to prevent, abate or minimize such release, or endangerment caused or threatened by the release. Respondents shall also immediately notify the OSC or, in the event of his/her unavailability, shall notify the Regional Duty Officer, Emergency Response Branch, Region 5 at (312) 353-2318, of the incident or Site conditions.

Respondents shall submit a written report to U.S. EPA within 7 business days after each release, setting forth the events that occurred and the measures taken or to be taken to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release. Respondents shall also comply with any other notification requirements, including those in CERCLA Section 103, 42 U.S.C. § 9603, and Section 304 of the Emergency Planning and Community Right-To-Know Act, 42 U.S.C. § 11004.

VI. AUTHORITY OF THE U.S. EPA ON-SCENE COORDINATOR

The OSC shall be responsible for overseeing the implementation of this Order. The OSC shall have the authority vested in an OSC by the NCP, including the authority to halt, conduct, or direct any work required by this Order, or to direct any other response action

undertaken by U.S. EPA or Respondents at the Site. Absence of the OSC from the Site shall not be cause for stoppage of work unless specifically directed by the OSC.

U.S. EPA and Respondents shall have the right to change their designated OSC or Project Coordinator. U.S. EPA shall notify the Respondents, and Respondents shall notify U.S. EPA, as early as possible before such a change is made, but in no case less than 24 hours before such a change. Notification may initially be made orally, but shall be followed promptly by written notice.

VII. PENALTIES FOR NONCOMPLIANCE

Violation of any provision of this Order may subject Respondents to civil penalties of up to \$25,000 per violation per day, as provided in Section 106(b)(1) of CERCLA, 42 U.S.C. § 9606(b)(1).

Respondents may also be subject to punitive damages in an amount up to three times the amount of any cost incurred by the United States as a result of such violation, as provided in Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3). Should Respondents violate this Order or any portion hereof, U.S. EPA may carry out the required actions unilaterally, pursuant to Section 104 of CERCLA, 42 U.S.C. § 9604, and/or may seek judicial enforcement of this Order pursuant to Section 106 of CERCLA, 42 U.S.C. § 9606.

VIII. REIMBURSEMENT OF COSTS

Respondents shall reimburse U.S. EPA, upon written demand, for all response costs incurred by the United States in overseeing Respondents' implementation of the requirements of this Order. U.S. EPA may submit to Respondents on a periodic basis a bill for all response costs incurred by the United States with respect to this Order. U.S. EPA's Itemized Cost Summary, or such other summary as certified by U.S. EPA, shall serve as the basis for payment.

Respondents shall, within 30 days of receipt of the bill, remit a cashier's or certified check for the amount of those costs made payable to the "Hazardous Substance Superfund," to the following address:

U.S. Environmental Protection Agency
Superfund Accounting
P.O. Box 70753
Chicago, Illinois 60673

Respondents shall simultaneously transmit a copy of the check to the Director, Superfund Division, U.S. EPA Region 5, 77 West Jackson Blvd., Chicago, Illinois, 60604-3590. Payments shall be

XI. MODIFICATIONS

Modifications to any plan or schedule may be made in writing by the OSC or at the OSC's oral direction. If the OSC makes an oral modification, it will be memorialized in writing within 7 business days; however, the effective date of the modification shall be the date of the OSC's oral direction. The rest of the Order, or any other portion of the Order, may only be modified in writing by signature of the Director, Superfund Division, Region 5.

If Respondents seek permission to deviate from any approved plan or schedule, Respondents' Project Coordinator shall submit a written request to U.S. EPA for approval outlining the proposed modification and its basis.

No informal advice, guidance, suggestion, or comment by U.S. EPA regarding reports, plans, specifications, schedules, or any other writing submitted by the Respondents shall relieve Respondents of their obligations to obtain such formal approval as may be required by this Order, and to comply with all requirements of this Order unless it is formally modified.

XII. NOTICE OF COMPLETION

After submission of the Final Report, Respondents may request that U.S. EPA provide a Notice of Completion of the work required by this Order. If U.S. EPA determines, after U.S. EPA's review of the Final Report, that all work has been fully performed in accordance with this Order, except for certain continuing obligations required by this Order (e.g., record retention), U.S. EPA will provide written notice to the Respondents. If U.S. EPA determines that any removal activities have not been completed in accordance with this Order, U.S. EPA will notify the Respondents, provide a list of the deficiencies, and require that Respondents modify the Work Plan to correct such deficiencies. The Respondents shall implement the modified and approved Work Plan and shall submit a modified Final Report in accordance with the U.S. EPA notice. Failure to implement the approved modified Work Plan shall be a violation of this Order.

XIII. ACCESS TO ADMINISTRATIVE RECORD

The Administrative Record supporting these removal actions is available for review during normal business hours in the U.S. EPA Record Center, Region 5, 77 W. Jackson Blvd., Seventh Floor, Chicago, Illinois. Respondents may contact Nancy-Ellen Zusman, Assistant Regional Counsel, at (312) 886-5825 to arrange to review the Administrative Record. An index of the Administrative Record is attached to this Order.

XIV. OPPORTUNITY TO CONFER

Within 3 business days after receipt of this Order, Respondents may request a conference with U.S. EPA. Any such conference shall be held within 5 business days from the date of the request, unless extended by agreement of the parties. At any conference held pursuant to the request, Respondents may appear in person or be represented by an attorney or other representative.

If a conference is held, Respondents may present any information, arguments or comments regarding this Order. Regardless of whether a conference is held, Respondents may submit any information, arguments or comments (including justifications for any assertions that the Order should be withdrawn against a Respondent), in writing to U.S. EPA within 2 business days following the conference, or within 7 business days of receipt of the Order if no conference is requested. This conference is not an evidentiary hearing, does not constitute a proceeding to challenge this Order, and does not give Respondents a right to seek review of this Order. Requests for a conference shall be directed to Nancy-Ellen Zusman, Assistant Regional Counsel, at (312) 886-5825. Written submittals shall be directed as specified in Section V.2 of this Order.

XV. SEVERABILITY

If a court issues an order that invalidates any provision of this Order or finds that Respondents have sufficient cause not to comply with one or more provisions of this Order, Respondents shall remain bound to comply with all provisions of this Order not invalidated by the court's order.

XVI. EFFECTIVE DATE

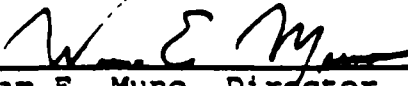
This Order shall be effective 10 business days following issuance unless a conference is requested as provided herein. If a conference is requested, this Order shall be effective 5 business days after the day of the conference.

IN THE MATTER OF:

LINDSAY LIGHT II SITE
CHICAGO, ILLINOIS

IT IS SO ORDERED

BY:



William E. Muno, Director
Superfund Division
United States
Environmental Protection Agency
Region 5

DATE: 6/6/76

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL ACTION

ADMINISTRATIVE RECORD
FOR
LINDSAY LIGHT II
CHICAGO, ILLINOIS

UPDATE #3
JUNE 3, 1996

<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
07/26/95	STS Consultants Ltd.	U.S. EPA	The Chicago Dock & Canal Trust Report for Characterization Investigation: Gamma Radiation Survey, Lindsay Light II Site, Chicago, IL w/Attachments A-E (3 Volumes)	1324

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL ACTION

ADMINISTRATIVE RECORD
FOR

LINDSAY LIGHT II
CHICAGO, ILLINOIS

UPDATE #2 (REVISED)
APRIL 1, 1996

<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
04/22/96	Simon, V., U.S. EPA	Muno, W., U.S. EPA	Action Memorandum: Determination of Threat to Public Health and the Environment at the Lindsay Light II Site, Chicago, IL	40

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL ACTION

ADMINISTRATIVE RECORD
FOR
LINDSAY LIGHT II
CHICAGO, ILLINOIS

UPDATE #1
SEPTEMBER 18, 1995

<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
09/00/93	Rogers & Associates Engineering Corporation	Chicago Dock & Canal Trust	Work Plan for Characterization of Radioactive Contamination, 316 East Illinois St., Chicago, Illinois: Appendix E, Supplemental; Other Sampling	17
10/05/95	Simon, V., U.S. EPA	Muno, W., U.S. EPA	Action Memorandum: Determination of Threat to Public Health or the Environment at the Lindsay Light II Site	22

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL ACTION

ADMINISTRATIVE RECORD
FOR
LINDSAY LIGHT II SITE
CHICAGO, ILLINOIS

ORIGINAL
May 2, 1994

<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
06/21/93	Karl, R., U.S. EPA	Klinger, J., Illinois Dept. of Nuclear Safety	Letter Illinois Dept. of Nuclear Safety	1
08/18/93	Kouris, T., Ecology & Environment, Inc.	Pfundheller, J., U.S.EPA	Letter re: Site Assessment	4
08/26/93	TMA Eberline	Ecology & Environment, Inc.	Thermoluminescent Dosimeter Badges Data	3
08/27/93	Klinger, J., Illinois Dept. of Nuclear Safety	Karl, R., U.S. EPA	Response to U.S. EPA Letter Dated 6/21/93	2
1/27/94	Muno, W., U.S. EPA	Chicago Dock & Canal Trust	Administrative Order by Consent	16
07/11/94	Simon, V., U.S. EPA	Muno, W., U.S. EPA	Action Memorandum	12

ATTACHMENT B

LIABILITY FILE INDEX

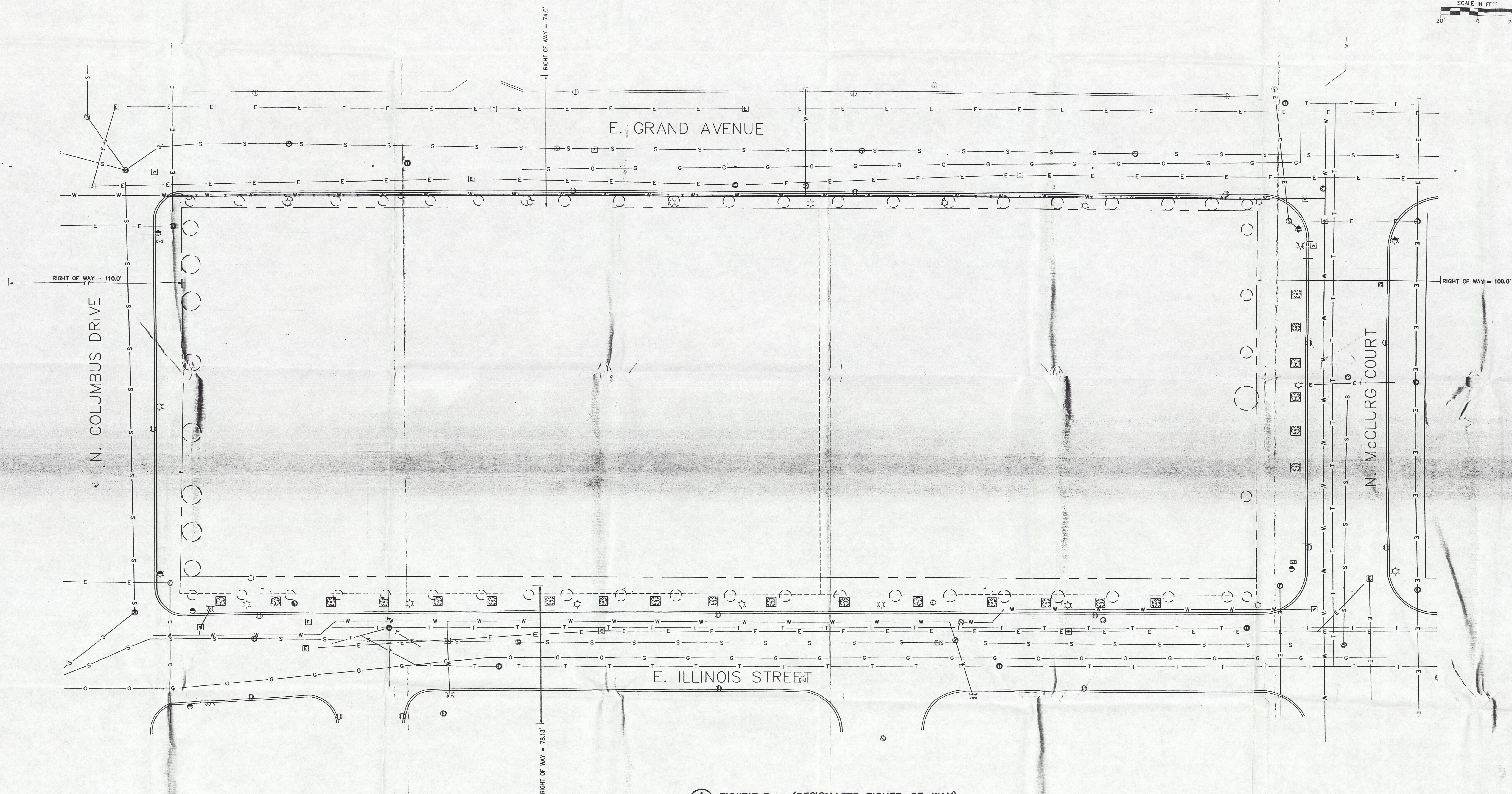
1. Minutes from meetings of Lindsay Light II Company.
1922, 1924, 1925, 1929, 1931.
2. Chicago Tribune article.
July 1993.
3. 104(e) response from Kerr-McGee Corporation.
January 3, 1994.
4. Press release issued by The Chicago Dock & Canal Trust.
July 6, 1993.
5. Enforcement Confidential Addendum from Action Memo.
April 1996.

**LIST OF RESPONDENTS RECEIVING UNILATERAL ADMINISTRATIVE ORDER
LINDSAY LIGHT II SITE**

Kerr-McGee Chemical Corporation
c/o Richard A. Meserve, Esq.
Covington & Burling
1201 Pennsylvania Avenue, N.W.
P.O. Box 7566
Washington, D.C. 20044-7566

Chicago Dock & Canal Trust
c/o Vincent S. Oleskiewicz, Esq.
Baker & McKenzie
One Prudential Plaza
130 East Randolph Drive
Chicago, Illinois 60601

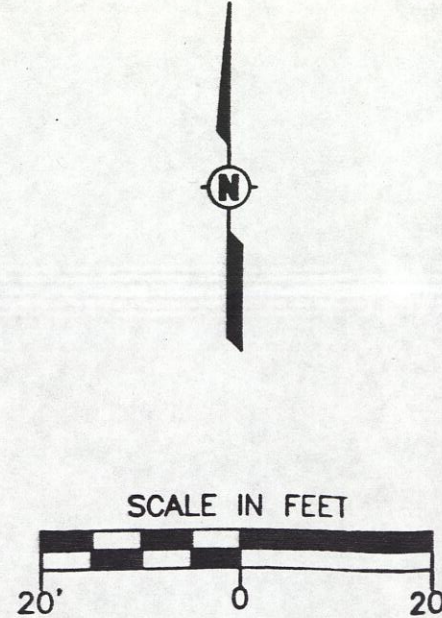
PROJECTS\24418\RR\plan1.dwg, Fri Sep 17 15:31:44 1999, STS VERNON HILLS, ILLINOIS 60061



1 EXHIBIT D - (DESIGNATED RIGHTS-OF-WAY)
SCALE: 1"=20'

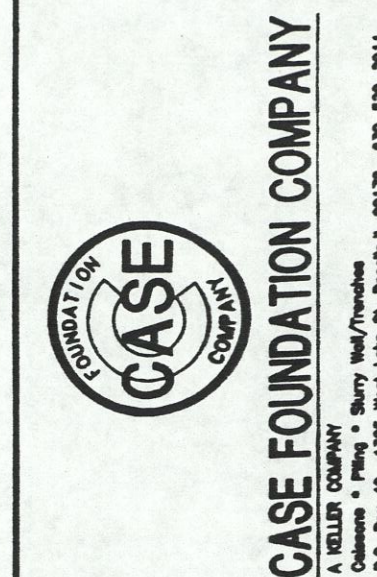
- NOTES:
- (A) - THE DESIGNATED RIGHTS-OF-WAY DO NOT INCLUDE ANY PORTIONS OF ANY PUBLIC STREETS OCCUPIED OR TO BE OCCUPIED BY IMPROVEMENTS LOCATED MAINLY ON THE SITE.
 - (B) - THE DESIGNATED RIGHTS-OF-WAY DO NOT INCLUDE AND AREA 5.17 FEET WIDE ADJACENT TO E. ILLINOIS STREET DEPICTED AS THE AREA "TO BE VACATED" ON THE DRAWING ATTACHED TO CITY OF CHICAGO ORDINANCE ENACTED SEPTEMBER 1, 1999.
 - (C) - THE DESIGNATED RIGHTS-OF-WAY DO NOT INCLUDE ANY ENCROACHMENTS CONSTRUCTED PURSUANT TO CITY OF CHICAGO ORDINANCE ENACTED OCTOBER 7, 1998 REGARDING APPROVAL FOR LOCATION OF ENCROACHMENTS WITHIN PUBLIC STREETS.
 - (D) - NO PORTION OF THE DESIGNATED RIGHTS-OF-WAY INCLUDES ANY PORTION OF THE SITE.
 - (E) - RIGHT-OF-WAY DIMENSIONS FROM 21st EDITION ATLAS OF COOK COUNTY, ILLINOIS, VOLUME 9, TH SOWELL COMPANY, 1998.

DESIGNATED RIGHTS-OF-WAY		DATE	4-13-98	DATE	4-13-98	DATE	4-13-98	DATE	4-13-98	DATE	4-13-98
RIVER EAST CENTER MIXED USE DEVELOPMENT 300 EAST ILLINOIS STREET CHICAGO, ILLINOIS		DATE	4-13-98	DATE	4-13-98	DATE	4-13-98	DATE	4-13-98	DATE	4-13-98
CASE FOUNDATION COMPANY		DATE	4-13-98	DATE	4-13-98	DATE	4-13-98	DATE	4-13-98	DATE	4-13-98
24418-RR		DATE	4-13-98	DATE	4-13-98	DATE	4-13-98	DATE	4-13-98	DATE	4-13-98
C:\plant1.dwg		DATE	4-13-98	DATE	4-13-98	DATE	4-13-98	DATE	4-13-98	DATE	4-13-98
SCALE AS SHOWN		DATE	4-13-98	DATE	4-13-98	DATE	4-13-98	DATE	4-13-98	DATE	4-13-98
SHEET NUMBER		DATE	4-13-98	DATE	4-13-98	DATE	4-13-98	DATE	4-13-98	DATE	4-13-98



DESIGNATED RIGHTS-OF-WAY

RIVER EAST CENTER
MIXED USE DEVELOPMENT
300 EAST ILLINOIS STREET
CHICAGO, ILLINOIS



SHEET NUMBER

DATE	QRS	4-13-98	GENERAL REVISIONS	5/19/98	TC
CHECKED BY	EJ	4-13-98	GENERAL REVISIONS	1/13/98	EJ
APPROVED BY	EJ	4-13-98	GENERAL REVISION	12/9/98	EJ
			GENERAL REVISION	5/22/98	EJ
			B.O.U. ISSUE	5/05/98	EJ

NOTES:

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**HIGHWAY AUTHORITY AGREEMENT
FOR RIGHTS-OF-WAY ADJACENT TO
RIVER EAST L.L.C.
LINDSAY LIGHT II PROJECT
HEALTH & SAFETY PLAN**

Permit Applicant

Date

Permit Applicant
Project Coordinator
Health & Safety Coordinator

Date

EMERGENCY PLAN/DESIGNATED RIGHTS-OF-WAY SURVEILLANCE PLAN

In the event excavation within the identified impacted area (Sheet 1.1) is required on an emergency basis, or if a permittee requires access to any portion of the designated rights-of-way, the following shall be incorporated to the extent possible, and all personnel working in the potentially impacted areas shall be given the opportunity to read this section of the Health and Safety Plan (HASP). The remainder of the attached HASP will be implemented as conditions allow.

A. PROTECT WORKERS POTENTIALLY EXPOSED TO IMPACTED SOIL

1. Notify workers that levels of radiation above background levels may be present in excavated soil.
2. Avoid ingesting soil.
Avoid inhaling dust from contaminated areas.
Minimize contact with the soil to the extent possible.
Wear protective coveralls or disposable coveralls to facilitate cleanup of workers.
3. Screen excavation for gamma radiation (Nal detector)

B. AVOID SPREAD OF CONTAMINATION

1. Limit erosion transport of excavated soil through use of hay bales, sand bags, temporary berm materials to minimize uncontrolled runoff.
2. Cover any excavation soil piles until screened for potential contamination.
3. Screen soil prior to transport away from project site using Nal gamma detector.

C. MINIMIZE POTENTIAL PUBLIC CONTACT.

1. Limit access to excavated soil using barricades, temporary fencing, jersey barriers.
2. Cover excavated piles to minimize fugitive dust. Wet dusty excavations.
3. Control, to the extent possible, off-site tracking by vehicles, potentially contaminated boots or clothing by workers.

D. MONITOR CONTAMINATION

1. To the extent practicable, provide gamma radiation screening of the exposed soils in the excavation (Nal detector).
2. When possible, provide high volume air samplers immediately adjacent to potential or known exposed contaminated soil, to monitor for fugitive emissions (dust, radon gas). [This is not required for the surveillance of designated rights-of-way.]

3. Survey ground surface/pavement surface around potential or known contamination locations for elevated gamma radiation (NaI detector).

E. DISPOSAL

1. Any excavated material should be disposed as required by law.

F. NOTIFY AUTHORITIES

Notify agencies identified on the enclosed emergency notification list. **[This is not required for the surveillance of designated rights-of-way.]**

USEPA	312-353-2318	
IDNS	217-785-0600	(Illinois Department of Nuclear Safety)
Chicago D.E.	312-744-7672	(Chicago Department of the Environment)
IEMA	217-782-7860	(Illinois Emergency Management Agency)

Notification should include, as a minimum, the following

- Location of Excavation
- Potential Contact with Thorium Containing Soil (11 (e)(2) by-product material)
- Field surveys and sampling measured a maximum total radium (Ra226 + Ra228) concentration of 600 pCi/gm in soils remaining, although higher concentrations may be present.

The following support services should be secured:

- Gamma radiation survey equipment (micro-R meter, NaI detector) should be secured promptly for site screening.
- Health Physics contractors, personnel and monitoring equipment should be secured promptly to provide survey and monitoring services in accordance with the attached plan.

APPENDIX A

PERSONNEL QUALIFICATIONS

The following are minimum qualifications for project personnel.

Project Coordinator:

- OSHA 40-hour health and safety training
- 8-hour supervisory training
- 4-hour radiation hazard training
- Responsible for work order implementation
- Familiar with this HASP

Field Team Leader:

- OSHA 40-hour health and safety training
- 4-hour radiation hazard training
- Responsible for tailgate safety meetings
- Familiar with this HASP

Health Physics Personnel (under direct supervision of a CHP):

- OSHA 40-hour health and safety training
- Familiar with this HASP
- Responsible for dosimeter/personnel monitoring in accordance with Section 4.3.2 of this HASP

Health and Safety Coordinator:

- OSHA 40-hour health and safety training
- 8-hour supervisor training
- 4-hour radiation hazard training
- Familiar with this HASP
- Authorized to enforce provisions of this HASP

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Appendix A.	Personnel Qualifications
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EMERGENCY PHONE NUMBERS

IN THE EVENT OF AN EMERGENCY DIAL: 911

AMBULANCE SERVICE911
FIRE DEPARTMENT911
EMERGENCY RESCUE SERVICE911
POLICE DEPARTMENT911
NATIONAL RESPONSE CENTER1-800-424-8802

POISON CONTROL CENTER1-800-732-2200
NORTHWESTERN MEMORIAL HOSPITAL(312) 908-2000
ILLINOIS DEPARTMENT OF NUCLEAR SAFETY
(IDNS) EMERGENCY NUMBER(217) 785-0600

PERMIT APPLICANT

ILLINOIS EMERGENCY MANAGEMENT(217) 782-7860
U.S. EPA REGION V 24-HOUR EMERGENCY(312) 353-2318
NUMBER

1. SCOPE OF PLAN

1.1 Work of Plan

The following Health and Safety Plan (HASP) will be utilized and modified as necessary in order to minimize and prevent exposures to hazardous substances and conditions related to excavation in public rights-of-way adjacent to the Lindsay Light II site. These rights-of-way and identified impacted areas are shown on Sheet 1.1, and are referred to herein as the Site.

All personnel assigned to work at the Site will be required to review the contents of this HASP and to strictly adhere to the policies and procedures listed herein. This HASP is for use only by the Permit Applicants, their designated contractors and consultants, and approved Site visitors. USEPA and other agencies are not considered visitors and will be required to conform to their own health and safety plans.

This plan meets the requirements of OSHA 29 CFR 1910.120, Hazardous Waste Operations and Emergency Responses, and applicable subparts of OSHA 29 CFR 1926, 1910, (particularly 1910.1096 pertaining to ionizing radiation), and 10 CFR, at the time this plan is being prepared (September 1999). The permit applicant should confirm that the proposed actions comply with regulations at the time the proposed actions are to be implemented.

1.2 Background

Thorium contamination of the Lindsay Light II Site resulted from operations related to the storage and processing of thorium-bearing sand. The Lindsay Light II Site was remediated under a Unilateral Administrative Order from the USEPA. Several areas of contamination remained outside the Lindsay Light II Site following the completion of the remediation. These areas exhibit radioactivity at levels above normal background for the area. Measurements were made along the entire excavated limits, with representative readings for the impacted zones shown on Sheet 1.1. The levels that might be encountered in excavating could be higher, based on measured levels previously excavated at vicinity locations.

The contaminated soil does not represent a risk as residual contamination in place. However, excavation in the areas exhibiting evidence of residual contamination requires appropriate health and safety procedures to protect workers and the public. These procedures are presented herein. Additionally, any contaminated material removed from the site will require appropriate management and disposal. A separate Work Order as is required for management and disposal of any contaminated excavation soil may be required. USEPA may require review and approval of a Work Order prior to start of work. That Work Order will identify volumes of material to be excavated and disposed, specify permits required for transport and disposal, identify the disposal sites, and specify the clean-up criteria based on the contamination encountered. For Lindsay Light II Site, the clean-up threshold for thorium impacted soil was 5 pCi/gm above background, with a background of 2.1 pCi/gm total radium.

The clean-up criteria was 7.1 pCi/gm total radium (Ra226 + Ra228). The waste management plan is not included herein as that will be project specific.

The objective in appropriate management of the contaminated material is to operate the proposed work under exposure levels which are as low as reasonably achievable (ALARA). This concept applies to exposure through ingestion, inhalation, external exposure, internal exposure, on-site or off-site. ALARA concepts should be considered throughout the implementation of the HASP, and the associated work in the impacted areas.

2. SAFETY MANAGEMENT

The following safety management structure will be utilized for the implementation, administration, and monitoring of the HASP.

2.1 HEALTH AND SAFETY COORDINATOR

The Health and Safety Coordinator (HSC) shall assume overall responsibility for the HASP. The HSC or designee shall monitor and maintain quality assurance of the HASP until project completion. Principal duties of the HSC include:

- Review project background data,
- Approve all HASP modifications,
- Administer and enforce the HASP,
- Evaluate the adequacy of personal protective equipment (PPE) to be used by Site personnel,
- Conduct required on-site training except tailgate safety meetings that will be conducted by the Field Team Leader,
- Brief visitors on work Site conditions, and
- Administer personnel and ambient air monitoring procedures.

The HSC or designee has the authority to stop work in the event conditions develop which pose an unreasonable risk to Site personnel or persons in the vicinity.

Appendix A presents qualifications for project personnel.

3. PERSONNEL RESPONSIBILITIES

The HSC or designee will administer and supervise the HASP at the work-site level. He will monitor all operations and will be the primary on-site contact for health and safety issues, and will have full authority to stop operations if conditions are judged to be hazardous to on-site personnel or the public.

The HSC will brief all Site personnel on the contents of the HASP. Personnel will be required to review the HASP, and have the opportunity to ask questions about the planned work or hazards. The Field Team Leader will conduct tailgate safety meetings to familiarize the Site personnel with Site conditions, boundaries, and physical hazards. Site personnel will conduct their assigned tasks in accordance with the HASP at all times.

If at any time Site personnel observe unsafe conditions, faulty equipment or other conditions which could jeopardize personnel health and safety, they are required to immediately report their observations to the HSC or Field Team Leader.

Work zones will be established at the Site. These zones include clean/support zones, decontamination zones, and exclusion zones. Although the clean/support zones are anticipated to remain fixed, other zones will move about the Site as work progresses. Sheet 1.1 shows the impacted areas where exclusion zones may be established during excavation activities.

4. HAZARD ASSESSMENT

The following represents potential hazards associated with this project.

4.1 PRINCIPAL CONTAMINANTS (KNOWN OR SUSPECTED)

- Thorium
- Uranium
- Radium
- Radon

The contaminants are present in the soil at low concentrations. These primary routes of entry to the body will be considered:

<u>ROUTE</u>	<u>ENTRY MADE VIA:</u>
Inhalation:	Airborne dust containing heavy metal radionuclides, and radon gases
Ingestion:	Airborne dust containing heavy metal radionuclides/contaminants. Improper or poor personal hygiene practices.
Eye and Skin:	Direct contact with contaminants. Improper or poor personal hygiene practices. Airborne dust containing heavy metal/radionuclide contaminant. Cuts and abrasions.
Direct Exposure:	Penetrating gamma radiation in air and soil.

4.2 PHYSICAL HAZARDS

Before field activities begin, the HSC will conduct a Site reconnaissance to identify any real or potential hazards created from Site activities. Physical hazards inherent to construction activities and power-operated equipment may exist.

4.2.1 Heat Stress

Field activities in hot weather create a potential for heat stress. The warning symptoms of heat stress include fatigue; loss of strength; reduced accuracy, comprehension and retention; and reduced alertness and mental capacity. To prevent heat stress, personnel shall receive adequate water supplies and electrolyte replacement fluids, and maintain scheduled work/rest periods.

The Field Team Leader or designee shall continuously visually monitor personnel to note for signs of heat stress. In addition, field personnel will be instructed to observe for symptoms of heat stress and methods on how to control it. One or more of the following control measures can be used to help control heat stress.

- Provision of adequate liquids to replace lost body fluids. Employees must replace body fluids lost from sweating. Employees must be encouraged to drink more than the amount required to satisfy thirst. 12 to 16 ounces every half hour is recommended. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement. Replacement fluids can be commercial mixes such as Gatorade.
- Establishment of a work regimen that will provide adequate rest periods for cooling down. This may require additional shifts of workers.
- Breaks should be taken in a cool and shaded rest area (77 degrees is best).
- Employees shall remove impermeable protective garments during rest periods.
- Employees shall not be assigned other tasks during rest periods.
- All employees shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

4.2.2 Cold Stress

If the field activities occur during a period when temperatures average below freezing, the following guidelines will be followed.

Persons working outdoors in temperatures of 40 degrees and below may suffer from cold exposure. During prolonged outdoor periods with inadequate clothing, effects of cold exposure may even occur at temperatures well above freezing. Cold exposure may cause severe injury by freezing exposed body surfaces (frostbite) or result in profound generalized cooling, possibly causing death. Areas of the body which have

high surface area-to-volume ratios such as fingers, toes and ears are the most susceptible to frostbite.

Two factors influence the development of a cold injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10° F with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at -18°F.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when external chemical-protective equipment is removed if the clothing underneath is perspiration-soaked.

Local injury resulting from cold is included in the generic term "frostbite". There are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost nip or incipient frostbite: Characterized by sudden blanching or whitening of skin.
- Superficial frostbite: Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep frostbite: Tissues are cold, pale, and solid; extremely serious injury.

Prevention of frostbite is vital. Keep the extremities warm. Wear insulated clothing as part of one's protective gear during extremely cold conditions. Check for symptoms of frostbite at every break. The onset is painless and gradual--you might not know you have been injured until it is too late.

To administer first aid for frostbite, bring the victim indoors and rewarm the areas quickly in water 95° to 100°F. Give individual a warm drink--not coffee, tea, or alcohol. The victim should not smoke. Keep the frozen parts in warm water or covered with warm clothes for 30 minutes, even though the tissue will be very painful as it thaws; then elevate the injured area and protect it from injury. Do not allow blisters to be broken. Use sterile, soft, dry material to cover the injured areas. Keep victim warm and get immediate medical care.

4.2.3 Electrical Hazards

Overhead power lines, downed electrical wires, buried cables and improper use of electrical extension cords can pose a danger of shock or electrocution. All Site personnel should immediately report to the Field Team Leader any condition that could result in a potential electrical hazard.

The Field Team Leader will notify Site personnel during the safety meetings of the locations of known underground cables and utilities.

4.2.4 Noise Hazard

Operation of equipment may present a noise hazard to workers. Site personnel will utilize hearing protection when noise levels are determined to be in excess of 29 CFR 1910.95 requirements. Noise monitoring will be performed to determine noise levels.

4.2.5 Overt Chemical Exposure

4.2.5.1 Non-Radioactive Exposure

Typical response procedures include:

SKIN CONTACT: Use copious amounts of soap and water. Wash/rinse affected area thoroughly, then provide appropriate medical attention. Eye wash will be provided on-site at the work zone and support zone as appropriate. If affected, eyes should be continuously flushed for a minimum of 15 minutes.

INHALATION: Move to fresh air and transport to hospital. Decontaminate as other actions permit.

INGESTION: Transport to emergency medical facility. Decontaminate as permitted by other requirements.

PUNCTURE WOUND OR LACERATIONS: Transport to emergency medical facility. Field Team Leader will provide Material Safety Data Sheets (MSDS) to medical personnel as requested. Decontaminate as permitted by other requirements.

4.2.5.2 Radioactive Exposure

The contamination materials are soil and debris which can reasonably be removed through the decontamination procedure in Section 9.0. Residual concentrations are not sufficient to produce an acute effect requiring emergency response.

4.2.6 Adverse Weather Conditions

In the event of adverse weather conditions, the Field Team Leader will determine if work can continue without endangering the health and safety of field workers. Some items to be considered before determining if work should continue are:

Potential for heat stress and heat-related injuries.

Potential for cold stress and cold-related injuries.

Treacherous weather-related working conditions.

Limited visibility.

Potential for electrical storms or high winds.

4.3 MEDICAL EVALUATION AND SURVEILLANCE PROGRAM

All field project personnel shall receive a medical evaluation in accordance with 29 CFR 1910.120 and Appendix A. Personnel who receive a medical evaluation will be notified by the medical contractor as to the outcome of their evaluation. This will be in the form of a confidential report addressed to the individual and will contain a breakdown of the clinical findings. In addition, it will indicate any areas of concern which would justify further medical consultation by the individual's personal physician. In the event that the areas of concern are of a severe nature, a follow-up notification will be made to the individual by the medical consultant to answer any questions the employee may have.

4.3.1 Dosimetry/Personnel Monitoring

All project personnel shall participate in a dosimetry program administered by the Project Health Physics Personnel. (The dosimetry program shall comply with 32 IAC 340¹, i.e. dosimeters shall be processed by a dosimetry processor accredited by the National Voluntary Laboratory Accreditation Program.) The Project Health Physics Personnel shall maintain records of all radiation exposures incurred by field personnel including all contractors. These records will be maintained in an up-to-date manner to comply with the requirements of 32 IAC 340.4010. The HSC shall review the results of personal exposure monitoring to determine compliance with exposure limit requirements. (Personnel qualifications for health physics personnel are included in Appendix A.)

4.3.2 Requirement for Dosimetry

Personal dosimetry is required for anyone who enters a radiologically controlled area in which he/she may receive in one calendar year a dose in excess of 10% of the limits in 32 IAC 340. Any person who works in a radiation area will be required to have a personal dosimeter. As a matter of policy, all individuals shall be required to use a dosimeter (either self-reading type, film badge or Thermoluminescence Detector (TLD)) whenever they enter the Exclusion Zone.

4.3.3 Bioassay

Bioassay is the determination of the types and amounts of radioactive materials which are inside the body. By analyzing the rate of deposition, the rate of excretion, and any other available information regarding placement in the body, internal exposures from radioactive materials can be estimated.

... Bioassays are not anticipated to be required for the excavation and removal activities proposed, based on levels documented as present. The determination of the need for bioassay will be based on dosimetry monitoring and review and recommendations from the Project Health Physics personnel.

¹ The IDNS regulations are usually more restrictive than US Nuclear Regulatory Commission (NRC) regulations. However, if there is a conflict between IDNS and NRC regulations, the NRC regulations will be used to determine compliance.

4.3.4 Emergency Medical Treatment

Emergency first aid should be administered on-site as appropriate. The individual should be decontaminated if possible, depending on the severity of the injury, and transported to the nearest medical facility, if needed. Treatment of the injury is of primary concern and decontamination a secondary concern. Levels of radioactive contamination at the Site could be acutely hazardous if decontamination is not undertaken during an emergency situation. The Field Team Leader will complete the appropriate incident report, if warranted. See Section 4.4, Accident and Incident Reporting.

An emergency first-aid station will be established and will include a first-aid kit for on-site emergency first aid.

Provisions for emergency medical treatment shall be integrated with the following guidelines:

- At least one individual qualified to render first aid and Cardiopulmonary Resuscitation (CPR) will be assigned to each shift.
- Emergency first aid stations in the immediate work vicinity.
- Conspicuously posted phone numbers and procedures for contacting ambulance services, fire department, police, and medical facilities.
- Maps and directions to medical facilities.
- Conspicuously posted evacuation routes and gathering area locations shall be posted around the Site.

4.4 ACCIDENT AND INCIDENT REPORTING

All accidents, injuries, or incidents will be reported to the HSC. This accident/incident will be reported as soon as possible to the employee's supervisor. An Accident/Incident Form will be completed by the Field Team Leader, and a copy will be forwarded to the Project Manager. A copy of the form is shown as Figure 4.1.

Accident/Exposure Investigation Report (Page 1 of 3)

[illegible]

Figure 4.1

Accident/Exposure Investigation Report (Page 3 of 3)

Accident/Exposure Investigation Report

Accident Description

Date & Time

Location

Employees Involved

Employee Interview/Statement—Injured Employee—Witness

Employee Name

Interviewed By

Accident Diagram/Photographs

Accident/Exposure Investigation Report (Page 2 of 3)

Accident Description

Location

Employees Involved

Preventive Action Recommendations

Manager Responsible

Date Completed

~~—Employee Lost Time—Temporary Help—Cleanup—Repair—Discussion—~~

Compliance

Total Cost

Production Loss

Date Completed

No

Date Started

Date _____

Safety Director Signature

Make additional copies of this form as needed. (form provided courtesy of Safety Publications of California © 1990)

5. TRAINING

All Site personnel shall be trained and certified in accordance with 29 CFR 1910.120.

5.1 PROJECT- AND SITE-SPECIFIC TRAINING

Prior to project start-up, all assigned personnel shall receive an initial project- and site-specific training session. This training shall include, but not be limited to, the following areas:

- Review of the Health and Safety Plan;
- Review of applicable radiological and physical hazards (including basic radiation principles and construction site hazards);
- PPE levels to be used by Site personnel;
- Site security control;
- Emergency response and evacuation procedures;
- Project communication;
- Required decontamination procedures;
- Prohibited on-site activities;
- Instructions to workers in accordance with 10 CFR 1912; and
- U.S. NRC Regulatory Guide 8.13 and Declared Pregnant Woman Policies (Females).

5.2 VISITOR ORIENTATION

All non-essential personnel and visitors who plan to enter the exclusion zone will be briefed on the HASP requirements and 10 CFR 1912 requirements prior to entry with a trained Site escort. In addition, female visitors will be instructed regarding U.S. NRC Regulatory Guide 8.13 and Declared Pregnant Woman Policies. Visitors will review the Visitor Information Sheet, Figure 5.1.

5.3 SAFETY "TAILGATE" MEETINGS

Before the start of work each day, the Field Team Leader will assemble the Site personnel for a brief safety meeting. The purpose of these meetings will be to discuss

project status, problem areas, conditions, safety concerns, PPE levels and to reiterate HASP requirements. The Field Team Leader will complete a Safety Meeting Report (Figure 5.2) to indicate the contents of the meeting and the attendees.

5.4 FIRST AID

At least one (1) individual, trained and qualified to administer first aid and CPR in accordance with American Red Cross requirements, will be present at the Site.

5.5 SAFE WORK PERMIT

Site workers in special work conditions such as confined space, hot work, trenching, or other physical hazards, must be skilled at such work and trained to recognize these as special work conditions. Confined space is defined by OSHA 1910.146. Section 13 of this HASP contains further information on the confined space program to be followed.

Figure 5.3 shows the Safe Work Permit to be completed by the HSC and signed by workers for special work conditions.

FIGURE 5.1 VISITOR INFORMATION SHEET

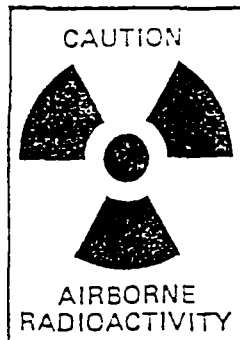
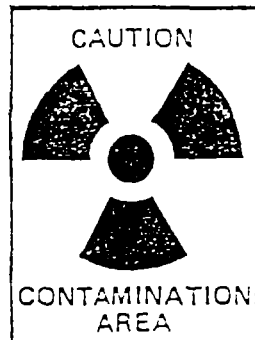
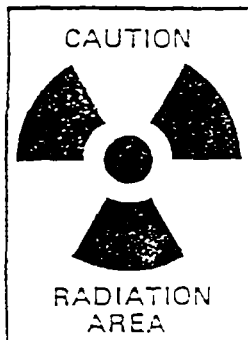
RM-4792

VISITOR INFORMATION

NOTICE TO VISITOR: ALL VISITORS MUST BE ESCORTED AT ALL TIMES WHILE ON THIS SITE.



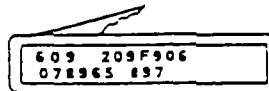
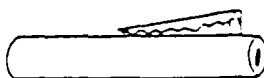
CAUTION. Radioactive materials are present on this site. Radioactive materials may be found throughout the site. Grounds, buildings and equipment have low levels of contamination.



CONTROLLED AREAS: Do not enter areas with these signs unless you have an escort or health physics has given specific approval and you understand access limitations.



You must wear protective clothing in controlled areas. Health physics will provide you with instructions.



You must wear a personal radiation dosimeter if you enter an area which is controlled.



No smoking, eating, drinking or chewing in controlled areas.
NO EXCEPTIONS.

You may request to see radioactive materials license for this facility as granted by the USNRC.
Notify Health Physics if you do not understand these instructions.

NAME _____ DATE _____

Figure 5.2

Safety Meeting Report (KM-4438-A, front side)

SAFETY MEETING REPORT KM-4438-A		DATE
DIVISION	DEPARTMENT/PLANT	DURATION OF MEETING <input type="checkbox"/> A.M. <input type="checkbox"/> P.M.
NUMBER PRESENT	NUMBER ABSENT	DID MEETING INCLUDE REQUIRED TRAINING? <input type="checkbox"/> YES (DESCRIBE BELOW) <input type="checkbox"/> NO
MEETING CONDUCTED BY		
DISCUSSION OF SAFE/UNSAFE WORK PRACTICES, MATERIALS, JOB PRECAUTIONS, HAZARDS, EQUIPMENT, FAMILIARIZATION, ETC.		
* SUPERVISOR'S PRESENTATION		
EMPLOYEE FEEDBACK	COMMENTS, QUESTIONS, COMPLAINTS, ETC.	
SUPERVISOR'S CORRECTIVE ACTION PLAN	KNOWN PLANS FOR CORRECTION, PARTS ON ORDER, ITEMS TO BE DISCUSSED WITH DEPT. HEAD, AND CORRECTION OF ITEMS PREVIOUSLY SUBMITTED	
DEPARTMENT HEAD COMMENTS	RESOLUTION OF QUESTIONS, ITEMS OR ISSUES RAISED IN MEETING OR WITH SUPERVISOR	
SUPERVISOR		DEPARTMENT HEAD
FACILITY MANAGER		Have employees attending sign on reverse side. Forward a copy to the local Safety Department.

Safety Meeting Report (KM-4438-A, reverse side)

Lindsay Light: Health and Safety Plan 400.1

Figure 5.3

Safe Work Permit (KM-2565-1-B, upper section of front side)

SAFE WORK PERMIT		KM-2565-1-B		COMPLETED PERMIT MUST BE POSTED AT THE ENTRY OR WORK SITE		
SHADED AREAS MUST BE COMPLETED.						
PLANT/DEPARTMENT		ISSUED BY		DATE	TIME (FROM) TO	
ACCEPTED BY		COMPANY/DEPARTMENT/CONTRACTOR				
RESPONSIBILITY TRANSFERRED TO (NAME)		CO-SIGNATURE (IF REQUIRED)				
LIST ALL WORKERS OR ATTACH ROSTER (OVER)		IS WORK AREA OSHA PSM REGULATED? <input type="checkbox"/> Yes <input type="checkbox"/> No				
AN ALERT, GAS RELEASE, EVACUATION, INTERRUPTION OF 8 HOURS OR MORE OR CHANGE IN WORKING CONDITIONS SUSPENDS THIS PERMIT. (Permit must be reissued or reauthorized)						
SECTION 1	GENERAL AREA WORK PERMIT	1. WORK LIMITED TO THE FOLLOWING. (DESCRIPTION & AREA/EQUIPMENT)				
		2. ON-SITE INSPECTION CONDUCTED/ALL LOCKS OR TAGS ATTACHED, IF REQUIRED/ENVIRONMENTAL IMPACT OF JOB CONSIDERED				PERMIT ISSUER INITIALS
		3. SPECIAL HAZARDS TO PROTECT AGAINST <input type="checkbox"/> NONE MSDS AVAILABLE <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A				
		CHEMICALS (NAME)				
		<input type="checkbox"/> Flammable <input type="checkbox"/> Noise <input type="checkbox"/> Hot Water/Steam <input type="checkbox"/> Thermal Burn <input type="checkbox"/> Falls <input type="checkbox"/> Pinch Pts./Srp. Edges <input type="checkbox"/> Electrical <input type="checkbox"/> Toxic <input type="checkbox"/> Corrosive <input type="checkbox"/> Heat Stress <input type="checkbox"/> Elect/High Vltg. Line <input type="checkbox"/> Asbestos <input type="checkbox"/> Other <input type="checkbox"/> Hydraulic/Pneumatic <input type="checkbox"/> Skin Contact <input type="checkbox"/> Reactive <input type="checkbox"/> High Pressure <input type="checkbox"/> Inert Atmosphere <input type="checkbox"/> Radiation <input type="checkbox"/> Other (magnitude)				ENERGY LEVEL
		4. SAFETY EQUIPMENT (OTHER THAN AREA REQUIREMENTS) <input type="checkbox"/> NONE				
		<input type="checkbox"/> Rain Suit <input type="checkbox"/> Gloves <input type="checkbox"/> Face Shield <input type="checkbox"/> Ground Fault Circuit Int. <input type="checkbox"/> Air Pack (SCBA) <input type="checkbox"/> Fire Resistant Cl. <input type="checkbox"/> Chemical Suit <input type="checkbox"/> Hearing Protection <input type="checkbox"/> Hood <input type="checkbox"/> Barricade/Warning Signs <input type="checkbox"/> Supplied Air <input type="checkbox"/> Long Sleeves <input type="checkbox"/> Rubber Boots <input type="checkbox"/> Chemical Goggles <input type="checkbox"/> Fall Restraint Device <input type="checkbox"/> Communications Equip. (Isol) <input type="checkbox"/> Respirator <input type="checkbox"/> Other				
		5. THE PERSON RECEIVING THE PERMIT VERIFIES THAT ALL WORKERS:				
		A. Have been through the Plant Safety Orientation <input type="checkbox"/> Yes <input type="checkbox"/> No B. Understand Applicable HAZCOM requirements <input type="checkbox"/> Yes <input type="checkbox"/> No C. Have discussed hazards of the job and area <input type="checkbox"/> Yes <input type="checkbox"/> No D. Know the location/use of safety showers/eye wash stations <input type="checkbox"/> Yes <input type="checkbox"/> No E. Know the location of the phone or intercom <input type="checkbox"/> Yes <input type="checkbox"/> No F. Know emergency alarms, evacuation, assembly points <input type="checkbox"/> Yes <input type="checkbox"/> No G. Know the Procedures for Safe Job Completion <input type="checkbox"/> Yes <input type="checkbox"/> No H. Have inspected all tools/equipment/scaffolding <input type="checkbox"/> Yes <input type="checkbox"/> No I. Understand the Housekeeping Requirements <input type="checkbox"/> Yes <input type="checkbox"/> No				PERMIT RECEIVER INITIALS
		6. POTENTIALLY AFFECTED AREA PERSONNEL AND WORKERS NOTIFIED OF WORK TO BE DONE <input type="checkbox"/> YES <input type="checkbox"/> N/A				
7. THE FOLLOWING RESPONSIBILITIES HAVE BEEN COMMUNICATED TO THE PERSON RECEIVING THIS PERMIT:						
<input type="checkbox"/> Conditions For Work Stoppage <input type="checkbox"/> Performing The Work Safely <input type="checkbox"/> Completion Of Section 8 And Permit Retu <input type="checkbox"/> Crew Accountability <input type="checkbox"/> Reporting Changes That Affect Job Safety						
SECTION 2	AIR TESTS	TEST IN ORDER INDICATED				
		1. Oxygen meter test performed <input type="checkbox"/> Yes <input type="checkbox"/> N/A READING %O ₂ RANGE 19.5-23.5% O ₂ TESTED BY LOCATION OF TEST TIME				
		2. Combustible gases and vapors test <input type="checkbox"/> Yes <input type="checkbox"/> N/A READING % LEL MAXIMUM 10% LEL TESTED BY LOCATION OF TEST TIME				
		3. Tests for toxics <input type="checkbox"/> Yes <input type="checkbox"/> N/A READING PPM PELTLY PPM TESTED BY LOCATION OF TEST TIME				
SECTION 3	OBSERVATION & RESCUE	<input type="checkbox"/> YES <input type="checkbox"/> N/A Continuous monitoring for _____ (SUBSTANCE) TESTED BY TIME (FROM) A.M. P.M. TIME (TO)				
		<input type="checkbox"/> YES <input type="checkbox"/> N/A Periodic tests for _____ (SUBSTANCE) TESTED BY TIME (FROM) A.M. P.M. TIME (TO)				
		<input type="checkbox"/> Duration of work <input type="checkbox"/> Area <input type="checkbox"/> Personal <input type="checkbox"/> Other				
		2. <input type="checkbox"/> YES <input type="checkbox"/> N/A Fire/safety/contained space attendants DESIGNATED PERSON(S) HOW TO CONTACT				
		3. <input type="checkbox"/> YES <input type="checkbox"/> N/A Backup rescuer(s) DESIGNATED PERSON(S) HOW TO CONTACT				
		4. <input type="checkbox"/> YES <input type="checkbox"/> N/A Special rescue service/ equipment required LOCATION OF SPECIAL EQUIPMENT RESCUE SERVICE PHONE NUMBER				

Figure 5.3

Safe Work Permit (KM-2565-1-B, lower section of front side)

		YES		NO		N/A		YES		NO		
SECTION 4	HOT WORK	<input type="checkbox"/> DOES NOT APPLY	1. Fire Extinguisher (Type: _____) Is it full?					8. Ground lead attached to work				
			2. Survey area for combustibles and openings, holes, trenches, etc.					9. Prevention of heat exposure to gasket, seals, liners				
			3. Combustible materials removed or protected					10. Other work in area which should be stopped				
			4. Heat/spark control - lamps, covers, water, etc.					11. Material present which emits vapor when heated				
			5. Precaution taken for hidden combustibles					12. Radiant heat transfer considered				
			6. Purge gas used. Type _____					13. Equipment operating or contains original contents				
			7. Adjacent areas safe/sewers protected					14. Ducts or conveyors plugged or protected				
			SECTION 5	ENERGY LOCKED/TAGGED	<input type="checkbox"/> DOES NOT APPLY	YES		NO		N/A		YES		NO
1. Line positively identified					9. Are all automatic valves secured in a safe position?							
2. Line(s) drained, depressured, purging procedure _____					10. Electrical panel switches locked, tagged and tested							
3. Line/equipment cleaned and purged					11. Field switches tested							
4. Blinds and/or block and bleed in place					12. Fuses removed/switches open							
5. Lock(s) required (list lockout points)					13. Are belts/couplings removed?							
6. Splash guards considered					14. Are rotating parts blocked?							
7. Adjacent area safe. (If limited, describe below)					COMMENTS							
8. Area roped/taped off												
SECTION 6	CONFINED SPACE	<input type="checkbox"/> DOES NOT APPLY	YES		NO		N/A		YES		NO	
			1. Confined space entry required?					5. Have authorized entrants signed opposite side of this form?				
			2. Space to be entered _____					6. Have designated attendants signed opposite side of this form?				
			3. Purpose of entry _____					7. Have all necessary hazard control measures been taken?				
			4. Is space a permit-entry space? If "YES", complete opposite column					8. Has all required equipment been provided?				
SECTION 7	TRENCHING/EXCAVATION	<input type="checkbox"/> DOES NOT APPLY	YES		NO		N/A		YES		NO	
			1. Has the area been inspected for underground power lines or product lines?					4. Have precautions been taken if the trench/excavation develops into a confined space?				
			2. Does the trench require shoring/bracing, support?					5. Have overhead power/product lines been removed or identified?				
			3. Has the soil been evaluated for stability?					6. Will leaking water or rain water affect the stability of the trench/excavation?				
SECTION 8	Questions to be Completed on Permit Expiration or Job Completion WORKER CLOSOUT SIGNATURE	<input type="checkbox"/> DOES NOT APPLY	YES		NO		N/A		YES		NO	
			1. Has the job been completed?					5. Have safety devices been reinstalled?				
			2. Has the area been cleaned of work material?					6. Has hot work area been surveyed for smoldering materials?				
			3. Have department personnel been informed job is done?					7. Special precautions, concerns or remarks?				
			4. Have all locks and/or tags been removed?					COMMENTS				
TIME	DATE											

Figure 5.3

Safe Work Permit (KM-2565-1-B, reduction of reverse side)

I have been instructed as a confined space attendant. I have a working knowledge of the hazards and conditions of the space and understand the duties of the attendant.						
		SIGNATURE	TIME IN	TIME OUT	DATE	
OBSERVERS WATCHERS RESCUERS						
I have been instructed in and am aware of the possible hazards and conditions I may encounter in this entry work.						
PERSONS AUTHORIZED TO PERFORM WORK AND/OR TO ENTER CONFINED SPACE		SIGNATURE	TIME IN	TIME OUT	DATE	
COMMENTS						
AUDIT PURPOSE ONLY	NAME OF AUDITOR		TITLE		DEPARTMENT	DATE
CONCERNS						
CORRECTIVE ACTIONS						
COMPLETED BY	NAME	TITLE	DEPARTMENT	DATE	COMMENTS	

6. COMMUNICATIONS

6.1 GENERAL COMMUNICATIONS

The Field Team Leader will have available at the Site the means for telephone communications, or an equivalent means of communication, for summoning emergency assistance from the fire/ambulance and police departments in the event they are required. The telephone will also act as a direct link to technical personnel for information pertaining to all phases of the project.

6.2 RADIOS/TELEPHONES

Short-range walkie talkies or cellular telephones will be made available to designated personnel working at the Site.

6.3 EMERGENCY WARNING

In the event of an emergency condition, the Field Team Leader will notify project personnel verbally if all are within immediate hearing and via a bull horn if the Site area is large. The Field Team Leader will also notify visitors present within the area. Site personnel will immediately proceed to a predesignated assembly area as designated by the Field Team Leader during the daily safety meeting. Personnel will remain in the designated area until further instructions are received by the Field Team Leader.

All communication equipment will be tested at the beginning of each day to verify operational integrity.

6.4 HAND SIGNALS

Hand signals will be used by field teams in conjunction with the buddy system. Hand signals shall be familiar to the entire field team before operations commence and should be reviewed during site-specific training.

<u>Signal</u>	<u>Meaning</u>
Hand gripping throat	Out of air; can't breathe
Grip partner's wrist	Leave area immediately; no debate
Hands on top of head	Need assistance
Thumbs up	OK; I'm all right; I understand
Thumbs down	No; negative

6.5 SITE SECURITY

Only authorized personnel will be permitted on the Site.

Visitors and other non-essential personnel may enter the work area only upon authorization by the Field Team Leader. This restricted access will ensure that the Field Team Leader can communicate with each person authorized to enter the work area.

7. PERSONNEL EXPOSURE AND AIR QUALITY MONITORING

7.1 AIR QUALITY (DUST)

Due to the nature of the principal contaminants associated with the project, dust suppression will be important as a means of minimizing exposure levels and off-site migration of contaminants. The Field Team Leader will routinely monitor the project area. The OSHA personal exposure limit (PEL) for nuisance dust is 15 mg/m³.

7.2 AIRBORNE RADIOACTIVITY MONITORING

Monitoring for airborne radioactivity exposure is as important as monitoring for external radiation exposure. Monitoring for airborne radioactivity exposure requires the following elements:

- Air sampling for radioactive particulates,
- Recordkeeping regarding personnel work locations and time in location, and
- Respiratory protective equipment records regarding devices used by workers in airborne radioactivity areas.

By closely monitoring these three elements, a continuous record of personnel exposure to airborne radioactivity is maintained.

Lapel samplers worn for personal air monitoring can be utilized for airborne radioactivity monitoring. Air filters shall be analyzed on a daily basis to determine potential contributions to dose from radionuclides. It is expected that naturally occurring radon and thorium daughters will interfere with analyses. Additional evaluation of samples shall be performed when determined necessary based upon elevated results. Such analyses shall be performed after allowing time for decay of some interfering radionuclides.

Downwind monitoring of the excavation areas for radioactive particulate activity also will be performed. High volume air samplers shall run continuously during operations and be evaluated on a daily basis for gross alpha activity. Comparisons will be made to 32 IAC 340 Appendix A to ensure that adequate radiological controls are in place for workers and the general public. As low as reasonably achievable (ALARA) concepts will be utilized when considering protective measures to ensure that internal exposures are minimized, while also considering the effects of such protective measures with respect to external exposures. Controls on the Site such as wetting of soils and procedural changes, will be employed prior to the prescription of respiratory protective

Airborne radon gas can represent a personnel exposure concern if allowed to accumulate in confined spaces. Open excavations which may qualify as OSHA confined spaces are not of a concern due to the ability of the gas to dissipate and accumulation time. Vaulted spaces which are ventilated as a normal confined space entry procedure will adequately relieve potential radon accumulations. If time and planning allow, working level measurements consisting of 5 minute sampling and 2 counts (90 minutes and 5 hours) can be taken to assess conditions.

Time decay of interfering nuclides generally refers to radon-222 decay and daughters but may also include thoron decay. The specific times for decay of samples is best addressed in procedures rather than in the health and safety plan. Air samples will be decayed a minimum of 5 hours to allow for counting without interference from radon-222 and its daughters. Thoron (Rn-220), if present in significant amounts, will require decay for up to 4 days to allow for decay of its Pb-212 daughter (10.6 hour half life).

After filters have been collected and decayed overnight, there will be a morning count of the filter that will serve to identify high gross counts for the previous day. This will alert health & safety staff of a potential problem which they can investigate more promptly. The count, after 4 days decay, will serve to be the official measurement of Th-Alpha.

7.3 INTERNAL MONITORING

Internal monitoring to determine intakes of radioactive material will be performed as needed based upon the results of the air sampling program. Bioassay methods to be considered should include in-vivo, as well as in-vitro, assessments. Routine bioassay of workers is not anticipated based upon the low concentrations of radioactivity in soils to be excavated.

7.4 EXTERNAL RADIATION MONITORING

External radiation monitoring of workers will be performed using film badges or thermoluminescent dosimeters. Dosimetry will be provided and processed by a service holding National Voluntary Laboratory Accreditation Program (NVLAP) certification. Pocket dosimeters may also be utilized for visitors and other infrequent personnel requiring access to the Site.

7.5 RADIOLOGICAL SURVEYS

Radiological surveys will be performed to ensure that radiation levels and contamination levels are within regulatory limits for workers and the general public. Radiation surveys will consist of ambient gamma surveys using micro-R meter (ion chamber or NaI) or tissue equivalent dose rate meter (Geiger-Mueller detectors), as appropriate, and contamination surveys.

7.6 CONTAMINATION MONITORING

Samples shall be obtained periodically in work areas to ensure that radioactivity is present at acceptable levels and is prevented from leaving the Site. Decontamination of elevated areas will be performed to maintain contamination at levels that are ALARA.

Before leaving the exclusion zone, Site personnel shall be checked through use of a hand-held frisker to ensure that contamination is not present on skin or clothes. The Field Team Leader will be immediately informed regarding any contamination on individuals and will initiate appropriate decontamination techniques. Proper disposition of contaminated personal effects and clothing also will be the responsibility of the Field Team Leader.

7.7 TOTAL ORGANIC VAPOR MONITORING

In addition to the radiological contaminants, there is a slight potential of encountering organic vapors. Organic vapors were encountered near the water table during previous investigation at the Site. Routine screening for total organic vapors will be conducted with a photoionization detector (PID), or similar type equipment, on a daily basis. The screening will evaluate ambient photoionization volatile organic vapors and some semi-volatile organic vapors.

Total organic vapors in ambient air will be obtained periodically with a PID during daily field activities. The PID provides real-time readings of exposure to volatile organics and some semi-volatile organics. Measurements will be made daily, prior to activities, to determine background levels. Monitoring measurements will be taken when:

- operations change,
- work moves to a different portion of the Site, and
- personnel observe contaminated materials.

These screening operations will be used to identify conditions requiring an upgrade to full-face respirators as described in Section 7.8.2.

7.8 ACTION LEVELS

7.8.1 Radiological Action Levels

Radiological action levels for on-site workers will be determined by smear/swipe measurements as well as airborne particulate monitoring for the presence of radioactivity. The Field Team Leader will perform radiological monitoring. The radioactive contamination on the Site is particulate and insoluble in water. Therefore, there will be no fixed contamination on the workers. Action levels as determined by radioactive monitoring can be found in Table 7.1.

To avoid the need for upgrade of personal protection equipment due to airborne contamination, engineering controls such as the use of water to minimize dust levels will be implemented as necessary during excavation and restoration activities.

7.8.2 Organic Vapors Action Levels

Permit Applicants will take a conservative approach to organic vapor monitoring at the Site. A PID will be used to monitor for organic vapors. Operations will be discontinued if the PID reads 5 ppm¹ or greater and the area will be evacuated. The Site Health and Safety Officer will retest the area wearing a full-face respirator. Operations will not resume until the PID reads less than 5 ppm, and remains below 5 ppm.

¹PID level obtained for Benzene from NIOSH Pocket Guide to Chemical Hazards.

TABLE 7-1

ACTION LEVELS AS DETERMINED BY RADIOACTIVITY

Note: Personnel shall not be exposed to airborne radioactivity such that their weekly intake exceeds 12 Derived Air Concentration (DAC)-hours without prior approval of the Field Team Leader or designee.

Level of protection may be increased to Level C (full-face air purifying respirator) when airborne monitoring indicates that contamination levels have reached 30% of the DAC. All assessments shall incorporate ALARA principles. Engineering controls shall be used prior to assignment of respiratory protective equipment.

Signs shall be posted at entrances to areas where airborne radioactivity levels exceed, or have the potential to exceed, 25% of the DAC.

Radiation Type	Action Level	Level of Respiratory Protection/Action
a. Contamination on smear samples	60 pCi/100 cm ² gross alpha ^(a)	Consider modified Level C (full-face APR) based upon ALARA evaluation.
b. Airborne Radioactivity	30% DAC ^(b)	Consider Level C (full-face APR) based upon ALARA evaluation. Ensure proper posting. Consider internal monitoring.
c. Ambient Gamma (work areas)	5 mrem/hr ^(c)	Consider procedures for shielding of soils. Ensure proper posting.
d. Ambient Gamma (off-site areas)	2 mrem/hr ^(c)	Implement immediate controls to reduce dose equivalent rate.

Notes

- (a) This is approximately 3 times the unrestricted release criteria in the NRC Regulatory Guide 1.86. If any dry-brushing or otherwise abrasive-type decontamination of the sampled equipment is required, the Action Level shown shall require modified Level C (full-face APR).
- (b) Potential Airborne Radioactivity Area as defined in 10 CFR 20. Workers with 1000 DAC-hours per year to date must wear modified Level C (full-face APR) until the end of the calendar year.
- (c) The ambient gamma dose equivalent rate action level of 5 mrem/hr stems from the 10 CFR 20 radiation area definition. If the ambient gamma dose equivalent rate reaches 2 mrem/hr, one or more of the following actions will be implemented: The source may be shielded; the working distance from the source may be increased; or the worker's exposure time may be limited.
- (d) The ambient gamma action level for off-site is based upon the 10 CFR 20 requirements to maintain dose equivalent rates in unrestricted areas such that they do not exceed 0.002 rem in any one hour.

8. PERSONAL PROTECTIVE EQUIPMENT

It is anticipated that most excavation activities^{in designated exclusion zones} can be conducted in Level D personal protective equipment (PPE), with a contingency upgrade to Level C, based on the action levels listed in Section 7. Level C will be used when required by Special Work Permits, or when directed by the Field Team Leader.

Level D personal protective clothing and equipment for excavation activities includes:

- Coveralls, launderable or disposable
- Hard hat,
- Chemical resistant, OSHA approved safety shoes/boots,
- Cotton or leather gloves,
- Safety glasses, and
- Dust mask (optional).

Level C protective clothing and equipment includes:

- Full-face air-purifying respirator (NIOSH/MSHA approved) fitted with radionuclides/HEPA cartridges and/or organic vapor cartridges, depending on which action levels are exceeded (see Section 7 of this HASP),
- Coveralls,
- Tyvek coveralls - required in areas when splashing by contaminated soils or water is a possibility,
- Cotton or leather gloves,
- Disposable latex inner gloves - required in areas when splashing by contaminated soils or water is a possibility,
- Nitrile outer gloves (taped) - required in areas when splashing by contaminated soils or water is a possibility,
- Chemical-resistant steel toe boots, and
- Hard hat.

Action levels used to determine the need to upgrade or downgrade the levels of protection are described in Section 7 of this HASP.

9. CONTAMINATION REDUCTION PROCEDURES

9.1 EQUIPMENT

Portable equipment will be decontaminated with soap and water and rinsed with tap water. Heavy equipment will be steam-cleaned with water and, if necessary, a detergent solution. It is not anticipated that chemical cleaning will be necessary for decontamination.

9.2 PERSONNEL

If levels of radioactivity show that individuals can remove coveralls and other personal protective clothing and equipment before leaving the work-site and, thus complete decontamination, the individuals may leave the Site. If, however, levels of radioactivity show that individuals cannot achieve decontamination by the removal of coveralls and showering is required, they will be dressed in clean coveralls, boots and gloves and be transported to a hospital emergency room/trauma center capable of chemical contamination response to complete decontamination.

If substantial skin contamination occurs on an individual working with radioactive materials, the following specific procedures should be followed to prevent fixation of the material in the skin or absorption of the radioactivity through the skin.

Immediate Action: Notify the HSC or Field Team Leader, who will supervise the decontamination. If contamination is spotty, the HSC or Field Team Leader will supervise the cleaning of the individual spots with swabs, soap, or water. If the contamination is general, the HSC or Field Team Leader may recommend washing the area gently in warm or cool water (not hot) using hand soap (not detergent) for one minute. Rinse, dry, and monitor for radioactivity. This soap wash step may be repeated three times.

Evaluation: If the above procedure fails to remove all the skin contamination, the treatment should cease. An evaluation of the skin contamination should be performed by the HSC or Field Team Leader including an estimate of the dose commitment to the skin, and the quantity and identity of the nuclides contaminating the skin. If additional decontamination steps are necessary, they are performed and documented by the HSC. The guidelines for Personnel Decontamination in the Radiological Health Handbook, HEW 1970, beginning on page 194, can be used as applicable. CAUTION: Do not use chemicals for personnel decontamination until full evaluation of the contamination is made by the HSC or Field Team Leader.

9.3 CONTAMINATION PREVENTION

Work practices that minimize the spread of contamination will reduce worker exposure and help ensure valid sample results by precluding cross-contamination. Procedures for contamination avoidance include:

- knowing the limitations of all personal protective equipment being used,
- avoiding walking through areas of obvious or known contamination,
- refraining from handling or touching contaminated materials directly. Do not sit or lean on potentially contaminated surfaces,
- ensuring personal protective equipment has no cuts or tears prior to donning,
- fastening all closures on suits, covering with tape if necessary,
- taking steps to protect against any skin injuries,
- staying upwind of airborne contaminants, and
- when working in contaminated areas, refraining from eating, chewing gum, smoking, or engaging in any activity from which contaminated materials may be ingested.

9.4 DISPOSAL PROCEDURES

All discarded materials, waste materials, or other field equipment and supplies should be handled in such a way as to preclude the spread of contamination, creating a sanitary hazard, or causing litter to be left on-site. All potentially contaminated waste materials (e.g., clothing, gloves) shall be monitored and segregated in accordance with monitoring results into either radioactive or non-radioactive waste. Appropriate labels shall be affixed to all containers of radioactive materials.

10 GENERAL WORK PRECAUTIONS

10.1 GENERAL WORK PRECAUTIONS

The following general work precautions apply to all Site personnel.

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the work area.
- Hands and face must be thoroughly washed upon leaving the work area. Wash water will be provided at the Site for this purpose.
- Whenever levels of radioactivity warrant, the entire body should be thoroughly washed, as soon as possible, after the protective coveralls and other clothing are removed as part of the decontamination process.
- No facial hair that interferes with a satisfactory fit of the mask-to-face-seal is allowed on personnel required to wear respirators.
- Contact with contaminated or suspected contaminated surfaces should be avoided. Whenever possible, do not walk through puddles, leachate, discolored surfaces, kneel on ground, lean, sit, or place equipment on drums, containers, or the ground.
- Medicine, drugs and alcohol may interfere with or impair judgment and reaction times. Therefore, usage of prescribed drugs must be specifically approved by a qualified physician and made known to the Field Team Leader prior to an individuals' presence on the work-site. Alcoholic beverage intake is strictly prohibited at the Site and prior to work.
- All personnel must be familiar with standard operating procedures and any additional instructions and information contained in the HASP.

- All personnel must adhere to the requirements of the HASP.
- Contact lenses are not permitted when respiratory protection is required or where the possibility of a splash exists.
- Personnel must be cognizant of symptoms for radiological exposure on-site, for heat stress and cold stress, and knowledgeable regarding emergency measures contained in the Emergency Contingency Plan.
- Respirators shall be cleaned and disinfected after each day's use or more often, if necessary.
- Prior to donning, respirators shall be inspected for worn or deteriorated parts. Emergency respirators or self-contained devices will be inspected at least once a month and after each use.
- Each employee shall be familiar with the project's Respiratory Protection Program.

10.2 OPERATIONAL PRECAUTIONS

The following operational precautions must be observed at all times.

- All Site personnel shall be adequately trained and thoroughly briefed on anticipated hazards, equipment to be worn, safety practices to be followed, emergency procedures, and communications.
- All required respiratory protective devices and clothing shall be worn by all personnel going into areas designated for wearing protective equipment.
- All Site personnel shall use the buddy system when wearing respiratory protective equipment. At a minimum, a third person, suitably equipped as a safety backup, is required during extremely hazardous entries.
- During continual operations, on-site workers act as a safety backup to each other. Off-site personnel provide emergency assistance.
- Personnel should practice any unfamiliar operations prior to undertaking the actual procedure.
- Entrance and exit locations shall be designated and emergency escape routes delineated. Warning signals for Site evacuation must be established.
- Personnel and equipment in the contaminated work area should be minimized, consistent with effective Site operations.

- Work areas for various operational activities shall be established.
- Procedures for leaving a contaminated area shall be planned and implemented prior to going on-site. Work areas and decontamination procedures shall be established based on expected Site conditions.
- Frequent and regular inspection of Site operations will be conducted to ensure compliance with the HASP. If any changes in operation occur, the HASP will be modified to reflect those changes.

11. SANITARY FACILITIES

11.1 POTABLE WATER

- a. An adequate supply of potable drinking water shall be maintained at all times immediately outside the Site. Drinking water shall meet all federal, state and local health requirements.
- b. Drinking water shall be supplied to project personnel via approved dispensing sources.
- c. Paper cups shall be permitted for the drinking of potable water supplies.
- d. Drinking water dispensers shall be clearly marked and shall, in no way, have the potential for contamination from non-potable supplies.
- e. Site personnel must be fully decontaminated prior to approaching the drinking water supply.

11.2 TOILET FACILITIES

- a. Adequate toilet facilities shall be provided at the Site.
- b. These facilities shall be in the form of portable chemical toilets.
- c. Routine servicing and cleaning of the toilets should be established with the selected contractor and shall be in accordance with federal, state, and local health regulations.
- d. Site personnel must be fully decontaminated prior to approaching the toilet facilities.

11.3 WASHING AREAS

- a. Adequate washing areas shall be provided for personal use within the work area.
- b. Washing areas shall be maintained in a sanitary condition and will be provided with adequate supplies of soap, towels for drying, and covered waste receptacles.
- c. Washing areas shall be maintained and sanitized daily.
- d. No eating, drinking or smoking shall be permitted in the work area. This policy will be strictly enforced by the Field Team Leader.

12. FIRE CONTROL EQUIPMENT

An adequate number of approved portable fire extinguishers (class rated A, B and C) shall be readily available at the Site at all times.

All Site personnel shall be trained in the use of the extinguishers. Extinguishers shall only be used on outbreak stage fires or fires of minor nature. The local fire department shall be contacted in the event of a larger fire and Site evacuation procedures should be commenced in accordance with the procedures described in the Emergency Contingency Plan.

13. CONFINED SPACE PROGRAM

13.1 PURPOSE

In the event that confined space work is a necessity, a Confined Space Program will be implemented. Training in the recognition of confined spaces is a component of the health and safety training program.

The purpose of the Confined Space Program is to establish procedures to protect personnel from this serious hazard in the course of their work; and at a minimum, to comply with 29 CFR OSHA 1910.146. This document assigns responsibilities and sets standards for personnel engaged in activities where confined spaces may be present.

13.2 RESPONSIBILITIES

13.2.1 Health and Safety Coordinator

The Health and Safety Coordinator administers the Confined Space Program. The Health and Safety Coordinator's responsibilities include:

- Review of the HASP for potential confined space hazards and design alternative approaches to accomplish the confined space tasks;
- Coordinating and managing the Confined Space Program in the event one is required;
- Establishing priorities for implementation of the program;
- Assisting with recognition and implementation of the Confined Space Program;
- Advising project management on confined space issues; and
- Communicating the Confined Space Program to personnel by training related to specific Site activities.

13.2.2 Project Manager

The Project Manager directs the application of the Confined Space Program to project work. The Project Manager is responsible for:

- Working with the Health and Safety Coordinator to prepare information describing activities that might be conducted in a confined space area;

- Assuring that all personnel engaged in project activities are familiar with the definition of a confined space.
- Assuring that personnel are familiar with the Confined Space Program, and that project activities are conducted in compliance with the Confined Space Program;
- Assuming the responsibilities of the Field Team Leader if another person is not assigned these responsibilities.

13.2.3 Field Team Leader

The Field Team Leader is responsible for the implementation of the Confined Space Program on-site during field activities. The Field Team Leader is responsible for:

- Overseeing implementation of the Confined Space Program during field operations; and
- Reporting confined space work activity, and any violations of the Confined Space Program, to the Project Manager and the Health and Safety Coordinator.

13.2.4 Personnel

Personnel are responsible for:

- Familiarizing themselves with the Confined Space Program and following it;
- Becoming familiar with the criteria for determining a confined space, and with the monitoring, permitting, and other requirements of the program; and
- Reporting immediately a confined space condition to the Field Team Leader.

13.3 DEFINITION OF A CONFINED SPACE

Confined space means a space that:

1. Is large enough and so configured that an employee can bodily enter and perform assigned work;
2. Has limited or restricted means for entry or exit (such as pits, storage bins, hoppers, crawl spaces, and storm cellar areas); and

3. Is not designed for continuous employee occupancy.

Any workspace meeting all of these criteria is a confined space and the Confined Space Program must be followed.

13.4 CONFINED SPACE ENTRY PROCEDURES

13.4.1 Safety Work Permit Required

All spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. The Safe Work Permit for entry into a confined space must be completed before work begins; it verifies completion of the items necessary for confined space entry. The Permit will be kept at the Site for the duration of the confined space work. If there is an interruption of work, or the alarm conditions change, a new Permit must be obtained before work begins.

A permit is not required when the space can be maintained for safe entry by 100% fresh air mechanical ventilation. This must be documented and approved by the Health and Safety Coordinator. Mechanical ventilation systems, where applicable, shall be set at 100% fresh air.

The Field Team Leader must certify that all hazards have been eliminated on the Entry Permit. If conditions change, a new permit is required.

13.4.2 Pre-entry Testing for Potential Hazards

a. Surveillance

Personnel first will survey the surrounding area to assure the absence of hazards such as contaminated water, soil, or sediment, barrels, tanks, or piping where vapors may drift into the confined space.

b. Testing

No personnel will enter a confined space if any one of these conditions exists during pre-entry testing. Determinations will be made for the following conditions:

1. Presence of toxic gases or dusts: Equal to or more than 5 parts per million (ppm) on the organic vapor analyzer with an alarm, above background outside the confined space area; or other action levels for specific gases, vapors, or dusts as specified in the Health and Safety Plan and the Confined Space Permit based on knowledge of Site constituents;
2. Presence of explosive/flammable gases: Equal to or greater than 10% of the Lower Explosive Limit (LEL) as measured with a combustible gas indicator or similar instrument (with an alarm); and

3. Oxygen Deficiency: A concentration of oxygen in the atmosphere equal to or less than 19.5% by volume as measured with an oxygen meter.

Pre-entry tests results will be recorded and kept at the Site for the duration of the job by the Field Team Leader. Affected personnel can review the test results.

c. Authorization

Only the Field Team Leader and the Health and Safety Coordinator can authorize any personnel to enter into a confined space. This is reflected on the Safe Work Permit for entry into a confined space. The Field Team Leader must assure that conditions in the confined space meet permit requirements before authorizing entry.

d. Safe Work Permit

An Safe Work permit for confined space entry must be filled out by the Health and Safety Coordinator or Field Team Leader. A copy of the Safe Work Permit is included as Figure 5.2

e. Attendants

One worker will stand by outside the confined space ready to give assistance in the case of an emergency. Under no circumstances will the standby worker enter the confined space or leave the standby position. There shall be at least one other worker not in the confined space within sight or call of the standby worker.

f. Observation and Communication

Communications between standby worker and entrant(s) shall be maintained at all times. Methods of communication that may be specified in the Safe Work Permit and the HASP may include voice, voice by powered radio, tapping or rapping codes, signaling tugs on rope, and standby worker's observations that activity appears normal.

13.4.3 Rescue Procedures

Acceptable rescue procedures include entry by a team of rescuers only if the appropriate self-contained breathing apparatus (SCBA) is available; or use of public emergency services.

The standby worker must be trained in first aid, CPR, and respirator use. A first aid kit should be on hand and ready for emergency use. The standby worker must be trained in rescue procedures. Retrieval of an unconscious victim in a confined space will only be conducted by trained rescue personnel. An emergency call to 911 will be initiated to assist the victim.

13.5 TRAINING

Personnel who will engage in field activities will be given annual training on the requirements and responsibilities in the Confined Space Program and on OSHA 1910.146. Only trained personnel can work in confined spaces. Workers should be experienced in the tasks to be performed, instructed in proper use of respirators, lifelines and other equipment, and practice emergency procedures and self-rescue.

Before each Site activity, the determination of confined space work will be part of the Site characterization process. Training in the site-specific confined space activities will be part of the site-specific health and safety training.

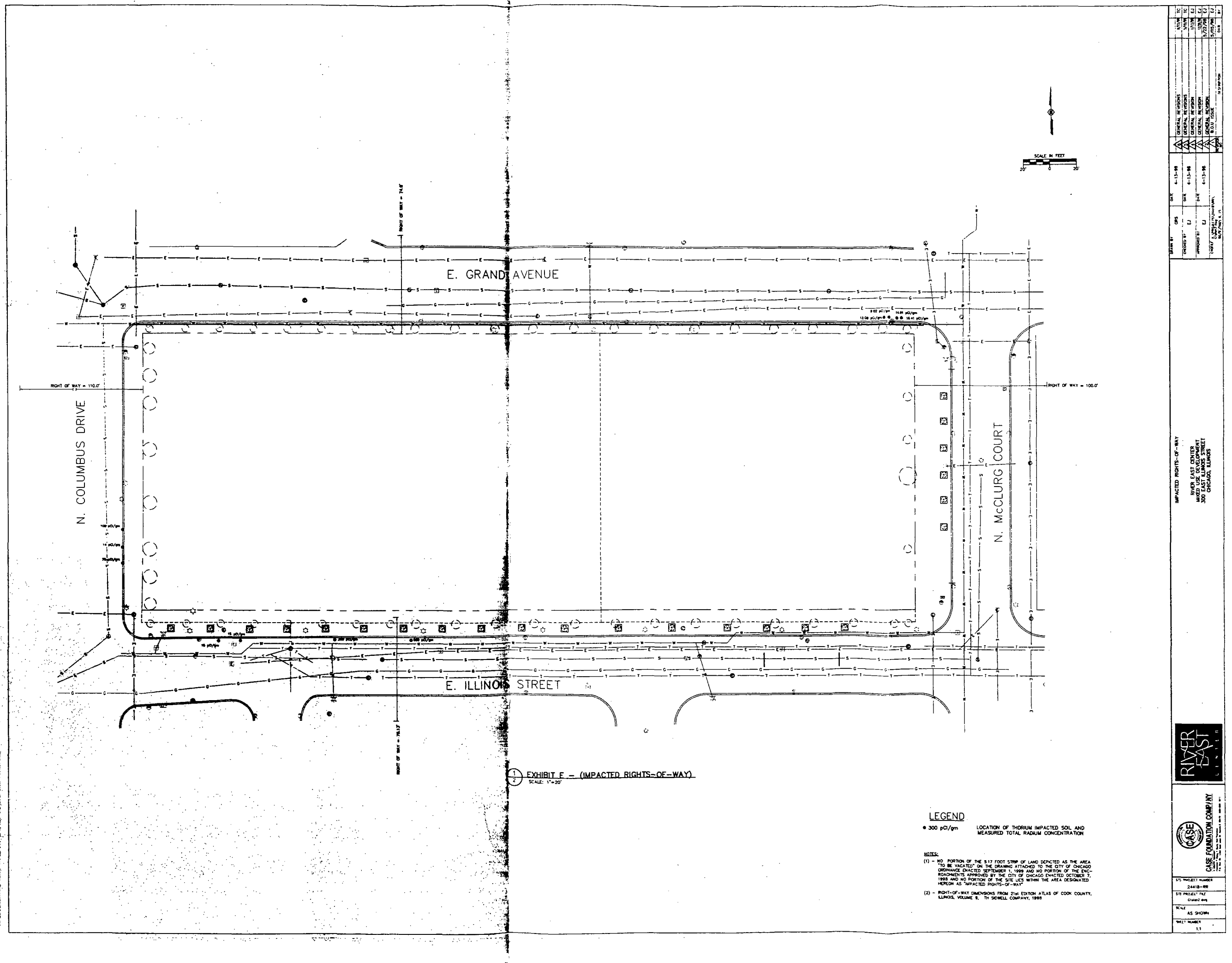
13.6 SAFE WORK PRACTICES

- Warning signs should be posted. These include warnings for entry permits, respirator use, prohibition of hot work and emergency procedures and phone numbers.
- Cylinders containing oxygen, acetylene or other fuel such as gasoline must be removed a safe distance from the confined space work area.
- Purging and ventilating is done before work begins to remove hazardous vapors from the space. The space should be monitored to ensure that the gas used to purge the space (e.g. tank) has also been removed. Local exhaust should be used where general exhaust is not practical.
- The buddy system is used at all times. A standby person always must be posted within sight of, or in communication with, the person inside the confined space. The standby should not enter the confined space, but instead will call for help in an emergency and not leave the post. Communication should be maintained at all times with workers inside the confined space.
- Emergency planning in the HASP and an Safe Work Permit must be approved in advance and the proper rescue equipment must be immediately available.

14. ELECTRICAL LOCKOUT/TAGOUT

The Field Team Leader must approve all work in areas requiring lockout/tagout procedures. Specific procedures and permitting requirements will be specified in the HASP, or in a revised HASP based on the need for a worker to work around electrical equipment.

All systems must be locked out and tagged before the work begins. This includes pipes, air lines, electrical equipment and mechanical devices. The equipment must be start tested and approved for use by a worker by the Health and Safety Coordinator or the Field Team Leader by start-testing to make sure the locked-out equipment does not operate.



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ATTACHMENT D

Field Modification for Slurry Wall Monitoring



STS Consultants, Ltd.
Solutions through Science & Engineering

August 16, 1999

Sent via Facsimile (312) 353-9176 and U.S. Mail

Mr. Fred Micks
On Scene Coordinator
USEPA, Region 5
77 W. Jackson Blvd., (SE-5J)
Chicago, Illinois 60604-3990

**RE: Field Modification to Work Order for Soil Management - Open Excavation
Section 4.4 Guide Wall Construction/Slurry Wall Construction - STS Project No.
24418-RR, Correspondence No. 051**

Dear Mr. Micks:

The following excerpt of the Work Order is taken from Section 4.4, pages 23-24 concerning Lake Lindsay slurry wall screening.

This material will be screened in the clam excavator bucket as it is excavated. Screening will be conducted with a 2 x 2 NaI gamma detector. Material exhibiting elevated gamma radiation above the 7.1 pCi/g threshold level will be placed in a staging area on plastic liners to drain before placement in a transport box. Runoff from the clam shell spoil which is determined to be contaminated will be contained with portable berms, and directed to the water collection system prior to discharge to the MWRDGC. Water will be treated according to MWRDGC guidelines before being discharged. Specific procedures for handling this material are described in Section 4.7. The soil staging area and water drainage pathway will require screening and clearance following removal of the contaminated trench spoil.

Proposed Field Modified Text

The material from the clam bucket will be screened within the clam bucket, if possible. This will depend on the particular clam bucket in use and accessibility to the soil. If the material in the bucket is not sufficiently exposed as a result of a soil thickness greater than 2 feet or limited access due to the construction of the bucket itself, the soil will be deposited in a staging area and screened using a walk-over survey method on a bucket by bucket basis using a 2 x 2 NaI detector. Slurry wall excavate will be screened to a minimum depth of 23 feet or to the top of the natural clay layer. Material exhibiting elevated gamma radiation above the 7.1 pCi/g threshold level will be placed in a staging area to drain and dry before placement in a transport box. Efforts shall be made to direct runoff from the clam shell spoil to the slurry trench. The soil staging area and water drainage pathway will require screening following removal of contaminated trench spoil.

USEPA
STS Project 24418-RR
August 16, 1999
Page 2

Please confirm your acceptance of this Work Plan Modification by returning a signed copy to Steve Michels (fax: 847-279-2510). Feel free to contact us in our office at (847) 279-2500 or on site at (847) 344-6384 with any questions or comments.

Signature: Fredrick A. Micke
Printed Name and Title: FREDRICK A. MICKE, OSC-USEPA
Date: August 17, 1999

Sincerely,

STS CONSULTANTS, LTD.

Eddie Hampson
Eddie Hampson
Project Coordinator

Steven S. Michels
Steven S. Michels, S.E.
Project Manager

cc: Randy Grueb, MCL (fax only)
Dan White, KM (fax only)
Torben Jensen, MDI (fax only)
Gary Pearson, Case (fax only)

OPTIONAL FORM 88 (7-90)

FAX TRANSMITTAL

of pages = 2

To: <u>Steve Michels</u>	From: <u>Fred Micke</u>
Dept./Agency: <u>STS</u>	Phone #: <u>312-884-5123</u>
Fax #: <u>847-279-2510</u>	Fax #: <u>353-9176</u>

NSN 7540-01-017-7500

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GENERAL SERVICES ADMINISTRATION

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TOTAL P.03

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